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This report is the second from a 3 1/2-year project. The prekindergarten research involved matched groups of children (91 experimental, 115 control), representative of the local population, whose developmental needs (motor, auditory, language, visual retention) were identified by a test battery. Half-day classes focused on specific need for 20 minutes daily. Activities were conducted within the framework of a well-balanced prekindergarten program. Results indicated that the experimental group excelled the control group not participating in the program at a statistically significant level of confidence. The kindergarten experiment was a followup study of the prekindergarten children of the previous year (80 experimental, 124 control). These children attended many different kindergarten programs. Results indicated that the experimental group did not maintain the superiority at a statistically significant level from the previous year. The effect of prekindergarten experience on primary school success will be measured during the third year of the project. (Author/JS)

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FINAL REPORT of Phase II
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Project is Continuing

THE EFFECTS OF ASSESSMENT AND PERSONALIZED PROGRAMMING ON SUBSEQUENT INTELLECTUAL DEVELOPMENT OF PREKINDERGARTEN AND KINDERGARTEN CHILDREN

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THE EFFECTS OF ASSESSMENT AND PERSONALIZED PROGRAMMING ON SUBSEQUENT INTELLECTUAL DEVELOPMENT OF PREKINDERGARTEN AND KINDERGARTEN CHILDREN

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University City, Missouri

July 1968

The research reported herein was performed pursuant to a contract with the Office of Education, U. S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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A.O.C.
J.M.D.

SUMMARY

Introduction.

This study reports the second year of the three and one-half year prekindergarten-kindergarten research project, the purpose of which is to examine the long range effects on success in school of personalized programming based on assessment of developmental needs of young children. This report is concerned with both aspects of the study: the Prekindergarten Field Test, First Year, involving four-year-old University City children in a well balanced prekindergarten program with emphases on strengthening skills in which developmental lags exist; and the Prekindergarten Experiment, Second Year, a follow-up of kindergarten children who had, the previous year, participated in a prekindergarten program (Prekindergarten Experiment, First Year) similar to the program just mentioned. These children attended many different public, private, and parochial kindergartens with varied program emphases. Teachers at both prekindergarten and kindergarten levels in the University City public schools were given personalized program recommendations based on the assessment of each child. Prekindergarten teachers were assisted by teacher aides who worked with individual or small groups of children in developmental skill improvement. Kindergarten teachers had no such assistance.

Two hypotheses were tested:

1. Prekindergarten children who are provided with a personalized program based on individual assessment of their developmental skills will increase their intellectual abilities and will learn at a higher level than children without this program.

2. The same prekindergarten children will retain their acquired superiority in later school years.

This report summarizes significant pretest and posttest results and posttest minus pretest growth of experimental children compared with matched and unmatched control groups, and/or subgroups.

Methods.

In the Prekindergarten Field Test, First Year, more than 200 four-year-old children representative of the local child population, following administration of a battery of tests (16 variables), were matched separately by sex for age, language quotient (L.Q.), intelligence quotient (I.Q.), and program need based on the level of skill development (motor, auditory, visual, language, retention, weak intact, strong intact) to provide equated groups and subgroups. The experimental children were designated by chance. Complete data for 91 experimental and 115 control children were available for analysis. Five comparisons for pretest, posttest, and posttest minus pretest findings were made separately by sex:

1. Total experimental group with total control group, matched for age, L.Q., and I.Q.

2. Experimental with control subgroups matched for age, L.Q., I.Q., and program need.

3. Unmatched experimental and control subgroups.

4. Unmatched experimental subgroups.

5. An additional comparison was made between the Prekindergarten Field Test, First Year, and the Prekindergarten Experiment, First Year (a similar study made in 1966-1967).

Univariate analyses of variance were used in the first four comparisons.

In the Prekindergarten Experiment, Second Year, more than 200 representative kindergarten children who had participated in the 1966-1967 Prekindergarten Experiment, First Year, were again matched separately by sex on pretests for age, language quotient (L.Q.), and intelligence quotient (I.Q.) to comprise an experimental and two control groups (children who attended nursery school, and those with no school experience). Complete data were available for analysis on 80 experimental children, 64 control children with nursery school, and 60 control children who had not attended nursery school. The groups were compared for pretest, posttest, and posttest minus pretest by means of multivariate and univariate analyses of variance to determine significance of differences.

Results and Findings.

Prekindergarten Field Test, First Year

Total Experimental with Total Control Groups. On the pretests, no significant differences were found between the experimental and control groups. Posttest results and posttest minus pretest growth for the combined sexes showed significant differences in 13 instances in each analysis favoring experimental children. In no test variable did the control group surpass the experimental group significantly.

Matched Experimental and Control Subgroups. Pretest findings revealed only one instance in which one subgroup exceeded another subgroup at a significant level on one test variable. Combining the figures for boys and girls, the posttest results showed that a total of ten experimental subgroups surpassed control subgroups in nine instances; on posttest minus pretest growth a total of ten experimental subgroups exceeded control subgroups in seven instances. In no instance did control surpass experimental subgroups at a significant level.

Unmatched Experimental and Control Subgroups. Subgroups of experimental boys grew substantially more than subgroups of control boys in a total of 44 instances, while control boys showed the more substantial growth in only 13 instances. Subgroups of experimental girls grew substantially more than subgroups of control girls in a total of 72 instances, while control girls showed the more substantial growth in only eight instances. Discussion of pretest and posttest data, having no particular interest if considered separately, are not included here.

Unmatched Experimental Subgroups. On pretests, the strongest experimental boys, in order, were strong intact, weak intact, and visual subgroups. The order for girls was strong intact, weak intact, language, and visual subgroups. Posttests for boys showed the order to be strong intact, weak intact, and language subgroups; for girls only the strong intact subgroup showed superiority over other subgroups of girls. When posttest minus pretest growth was considered, boys showing the greatest gains, in order, were those in the language and auditory subgroups; girls showing the greatest gains were in language, motor, and weak intact subgroups.

Prekindergarten Experiment, Second Year

No statistically significant differences were found among the three groups (experimental, control with nursery school experience, and control with no school experience) on pretests, posttests, or posttest minus pretest results either in skill development or in readiness for the first primary year. However, an examination of mean scores showed many instances, especially among girls, in which experimental children scored somewhat higher than those in the control groups.

Conclusions.

Findings from Phase I and Phase II of the study point up the positive impact the developmental skills program has at the prekindergarten level. However, superiority of the experimental group at a statistically significant level was not maintained at the end of the kindergarten year. During Phase III of this project, the effect of the prekindergarten experience on success in school will be measured for the first time as the children undertake the more formal demands of reading and mathematics.

INTRODUCTION

This study reports the second year of the three and one-half year prekindergarten-kindergarten research project, the purpose of which is to examine the long range effects on success in school of personalized programming based on assessment of developmental needs of young children. The research has been divided into three annual phases:

Phase I -- Prekindergarten Experiment, First Year
-- Kindergarten Field Test, One Year

Phase II -- Prekindergarten Experiment, Second Year
-- Prekindergarten Field Test, First Year

Phase III -- Prekindergarten Experiment, Third Year
-- Prekindergarten Field Test, Second Year

The half-year following Phase III will focus on further study of data from all three phases of the research for additional evidences of outcomes of the program which have not previously been examined in detail.

Results from Phase I were reported for prekindergarten classes in July 1967 (1) and kindergarten classes in December 1967 (2). Phase II, the subject of this report, presents a replication of the first year's project, incorporating program improvements and a more refined research design growing out of previous experience (Prekindergarten Field Test, First Year) and a follow-up study of Phase I children who have just completed kindergarten (Prekindergarten Experiment, Second Year). Both aspects of Phase II made use, in part, of matched experimental and control groups representative of the University City child population and personalized programs based on individual assessments of skills development for each child.

Each of the four prekindergarten classes was in session for two hours and forty-five minutes daily, five days a week, and was attended by 25 children who were guided by a teacher assisted by two teacher aides. The personalized programs emphasizing five specific developmental skills (motor, auditory, visual, language, retention) were scheduled for a twenty-minute period each day. Children whose test results showed no developmental lags participated in a twenty-minute daily Piaget-oriented program designed to foster the development of logical thinking. The remainder of the school day was focused on activities of a typical well balanced prekindergarten program selected to further social, emotional, physical, aesthetic, and cognitive growth. The four classes were housed in the same building, two meeting in the morning and two in the afternoon. In general, children with the same program need attended the same class. In this report, seven specific experimental groups are identified by program need as follows: motor (EM), auditory (EA), visual (EV), language (EL), retention (ER), weak performance with all skills intact (EW), strong performance with all skills intact (EI).

At the kindergarten level, the educational environment of the children was no longer controlled. Children attended one of 26 classes in the University City school district, programs in private and parochial schools in the local area, or public school kindergartens in nearby communities. An average of 25 children attended each of the classes in University City schools which met three hours daily, five days a week. One teacher was responsible for each group, and no teacher aides were assigned to work with the teacher. Programs varied, in the public, private, and parochial kindergartens, some emphasizing social growth, some developmental skills, and some academic skills.

Teachers at both the prekindergarten and kindergarten levels in the University City schools were given personalized program recommendations based on the assessment of each child. In addition, each teacher knew the level of functioning in all of the basic skills and just how much the child's performance varied from the average for his age. It was the individual teacher's responsibility to plan the daily activities for each child which would help strengthen severe weaknesses, if they existed, and to extend skills already developed.

Research which directly relates to this study includes that of Bloom (3) who pointed up the importance of the first six years of life with the growth of intelligence, Hebb (4) who stressed the necessity of early perceptual development in laying the groundwork for cognitive development, Hunt (5) who highlighted the vital part experience plays in the development of intelligence, and de Hirsch (6) who emphasized the importance of identification of poor risk children in time to help them.

Project Objectives Related to Research.

Among the several project objectives, the two concerned with the present research are:

1. To foster increased intellectual development of prekindergarten and kindergarten children through a personalized program based on assessments of each child's developmental skills.

2. To report statistical data resulting from the study of comparisons of children who participated in the experimental prekindergarten with matched groups of those who did not participate.

Hypotheses.

Two hypotheses are to be tested during the three phases of the study:

1. Prekindergarten children who are provided with a personalized program based on individual assessment of their developmental skills will increase their intellectual abilities, and will learn at a higher level than children without this program.

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2. The same prekindergarten children will retain their acquired superiority through kindergarten and the first primary year.

This report summarizes significant pretest and posttest results and posttest minus pretest growth of experimental children compared with matched and unmatched control groups and/or subgroups. Approximately nine months elapsed between the pretest and posttest.

METHODS

The Prekindergarten Field Test, First Year employed a research format modified from that of the previous year to permit comparisons of subgroups based on program need, as well as a comparison of the total experimental and control groups. In the Prekindergarten Experiment, Second Year, the same research design was used as in the first study in order to provide comparable data. The major analyses in each year of the Prekindergarten Experiment have been comparisons among experimental children, control children attending a usual private nursery school, and control children without school experience. In each study, children selected for experimental and control groups represented all religious, ethnic, socio-economic, and ability characteristics of the child population of University City. Data for both studies are based on raw scores, or L.Q. or I.Q. points. Each aspect of Phase II is presented separately.

Prekindergarten Field Test, First Year

Instruments Used.

Six instruments providing 13 dependent and two control variables were administered in this study. Three of these instruments are published tests; the other three measures were devised and standardized locally.

The following assessment instruments were used:

Beery: Developmental Test of Visual-Motor Integration (VMI) (7)
Illinois Test of Psycholinguistic Abilities (ITPA) (8)
Peabody Picture Vocabulary Test (PPVT) (9)
*Gross Motor Observations, Items 1-8 of the Total Motor Test
    (To refine the instrument, the arms extension test, Item 9, and ascending and descending steps, Items 10 and 11, were eliminated.) (10, 11)
*Three Dimensional Auditory Discrimination Test (12)
*Behavior Rating Scale (13)

An additional variable, counting consecutively from 1 to 101, was introduced.

A description of the assessment battery and major skills measured upon which individual assessments and personalized programming were based appear in Appendix A.

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*Devised and standardized locally.

Experimental and Control Groups.

In August 1967, more than 200 of 282 representative four-year-old applicants were selected for participation in the present prekindergarten study. They were matched separately by sex on pretests for age, language quotient (ITPA L.Q.), intelligence quotient (PPVT I.Q.), and program based on developmental need in one of seven areas--motor (M), auditory (A), visual (V), language (L), retention (R), weak intact (W), strong intact (I). From these equated groups seven experimental (E) and seven control (C) subgroups were designated by chance (EM, EA, EV, EL, ER, EW, EI; CM, CA, CV, CL, CR, CW, CI). A number of withdrawals necessitated rematching on the same pretest control variables in June 1968. Table 1 gives the number of children by sex and by major program need for whom complete data were available in this study.

Table 1. Number of Children Studied by Sex and Major Program Need

Program Need	BOYS		GIRLS	
	E	C	E	C
Motor	5	8	8	8
Auditory	3	2	2	2
Visual	6	6	5	5
Language	7	13	6	7
Retention	0	0	2	3
Weak Intact	15	9	9	13
Strong Intact	9	14	14	25
TOTAL	45	52	46	63

Methods of Analysis.

Age and the two control test variables (ITPA L.Q., PPVT I.Q.) and raw scores of 14 dependent test variables were analyzed on the basis of pretest, posttest, and posttest minus pretest differences in five comparisons among groups and subgroups. A one-way ANOVA program which provides chi square, univariate F and F prime tests, Duncan's New Multiple Range Test, and two-sided t-tests was used throughout (14).

(The more severe MANOVA program (15), used in the Prekindergarten Experiment, First Year, could not be adapted to these data as the number of variables exceeded the number of observations in most of the groups.) The comparisons, made separately for boys and girls, were:

1. Total experimental group (E) with total control group (C), matched for age, ITPA L.Q., and PPVT I.Q.

2. Experimental with control subgroups matched for age, ITPA L.Q., PPVT I.Q., and similar program need (EM with CM, EA with CA, etc.).

3. Unmatched experimental and control subgroups.

4. Unmatched experimental subgroups. (Data for unmatched control subgroup comparisons, being irrelevant to this study, were not examined.)

5. An additional comparison was made between the Prekindergarten Field Test, First Year (Phase II) and the Prekindergarten Experiment, First Year (Phase I).

Prekindergarten Experiment, Second Year

Instruments Used.

Six instruments providing 19 dependent and two control variables were administered in this study. Four of these instruments are published tests; the other two measures were devised and standardized locally.

The following assessment instruments were used:

Beery: Developmental Test of Visual-Motor Integration (VMI) (7)
Illinois Test of Psycholinguistic Abilities (ITPA) (8)
Peabody Picture Vocabulary Test (PPVT) (9)
*Gross Motor Observations, Items 1-8 of the Total Motor Test
    (To refine the instrument, the arms extension test, Item 9, and ascending and descending steps, Items 10 and 11, were eliminated.) (10, 11)
*Three Dimensional Auditory Discrimination Test (12)
Metropolitan Readiness Tests, Form B (16)

A description of the assessment battery and major skills measured upon which individual assessments and personalized programming were based appear in Appendix A.

---

*Devised and standardized locally.

Experimental and Control Groups.

Upon initiating the program two years ago, more than 200 of the 277 representative four-year-old applicants were matched on pretests for age, language quotient (ITPA L.Q.), and intelligence quotient (PPVT I.Q.) to provide two equated groups. The experimental group was designated by chance. Following posttesting in May 1967, the control group with nursery school experience (Cn) and the control group with no school experience (Co) were identified and were rematched with the experimental group (E) for research purposes. Because of the withdrawal of some children from the local area, the three groups (E, Cn, Co) were again rematched on the same pretest control variables following the second posttesting in May 1968. Table 2 shows the number of children for whom complete data were available for study.

Table 2. Number of Children
Studied by Group and Sex

Group	Boys	Girls
Experimental (E)	39	41
Control with nursery school experience (Cn)	30	34
Control without school experience (Co)	28	32
Total	97	107

Methods of Analysis.

Age, two control test variables, and 12 dependent test variables were examined for pretest, posttest, and posttest minus pretest growth among the experimental (E) and two control groups (Cn, Co). In addition, seven dependent variables from a single end-of-year test of readiness for the first primary year for each of the three groups were compared. The data were treated separately by sex. The statistical significance of differences was determined by means of the MANOVA computer program (15) which provided Wilk's lambda criteria, multivariate F tests, univariate F tests, t-tests, and group means for each control and dependent variable.

RESULTS AND FINDINGS

Findings are presented separately for the Prekindergarten Field Test, First Year and the Prekindergarten Experiment, Second Year.

Prekindergarten Field Test, First Year

Results of the five comparisons described on page 9 are reported separately.

Total Experimental (E) with Total Control (C) Groups.

In this analysis, the combined experimental and combined control groups were compared separately by sex. Chi square tests and significance of differences determined by univariate F and F prime tests for each variable are reported in Appendix C. For variables in which significances were found, further statistical data (Duncan's tests, t-tests, and group means) are provided in Appendix D.

Pretest Findings. Differences between experimental and control groups in each of the three control and 14 dependent variables were not significant, as determined by univariate F and F prime tests (Appendix C-1). Therefore, there was no need to review Duncan's tests and t-tests.

Posttest Findings. Statistically significant differences favoring the experimental groups were found in the posttest analyses. Experimental boys surpassed control boys on seven variables; experimental girls surpassed control girls on six variables. Table 3 shows the significant variables in each instance. (See also Appendixes C-2, D-1.)

Posttest Minus Pretest Findings. Statistically significant differences favoring the experimental groups were found in the posttest minus pretest analyses. Age for boys was the only variable that favored the control group. This was due to early testing of three experimental boys who were moving from the area. Experimental boys, however, surpassed control boys on five variables; experimental girls surpassed control girls on eight variables. Table 4 shows which of the variables were significant in each instance. (See also Appendixes C-3, D-2.) Figure 1 illustrates posttest minus pretest growth graphically. For each variable, growth is shown in L.Q., I.Q., or raw score points, except age which is given in months. Posttest significant differences are indicated by "S2"; posttest minus pretest significant differences are indicated by "Sg"; and where both posttest and posttest minus pretest differences are significant, "S2g" is used. Differences which are not significant are indicated by "ns."

Table 3. Significant Posttest Differences between Total Experimental and Total Control Groups by Sex

Variable	BOYS	GIRLS
	Groups	Groups
Age	ns	ns
ITPA L.Q.	E > C	E > C
PPVT I.Q.	ns	E > C
Beery VMI r.s.*	E > C	E > C
ITPA 1 r.s.	ns	ns
ITPA 2 r.s.	ns	E > C
ITPA 3 r.s.	ns	ns
ITPA 4 r.s.	E > C	ns
ITPA 5 r.s.	E > C	E > C
ITPA 6 r.s.	ns	ns
ITPA 7 r.s.	E > C	ns
ITPA 8 r.s.	ns	ns
ITPA 9 r.s.	ns	ns
Gross Motor Observations r.s.	E > C	E > C
Auditory Discrimination r.s.	ns	ns
Behavior Rating r.s.	E > C	ns
Counting	ns	ns

*r.s. indicates raw score.

Table 4. Significant Posttest Minus Pretest Differences between Total Experimental and Total Control Groups by Sex

Variable	BOYS Groups	GIRLS Groups
Age	C > E	ns
ITPA L.Q.	E > C	E > C
PPVT I.Q.	ns	E > C
Beery VMI r.s.*	ns	E > C
ITPA 1 r.s.	ns	ns
ITPA 2 r.s.	ns	ns
ITPA 3 r.s.	ns	E > C
ITPA 4 r.s.	E > C	E > C
ITPA 5 r.s.	E > C	E > C
ITPA 6 r.s.	ns	ns
ITPA 7 r.s.	E > C	ns
ITPA 8 r.s.	ns	ns
ITPA 9 r.s.	ns	E > C
Gross Motor Observations r.s.	E > C	E > C
Auditory Discrimination r.s.	ns	ns
Behavior Rating r.s.	ns	ns
Counting	ns	ns

*r.s. indicates raw score.

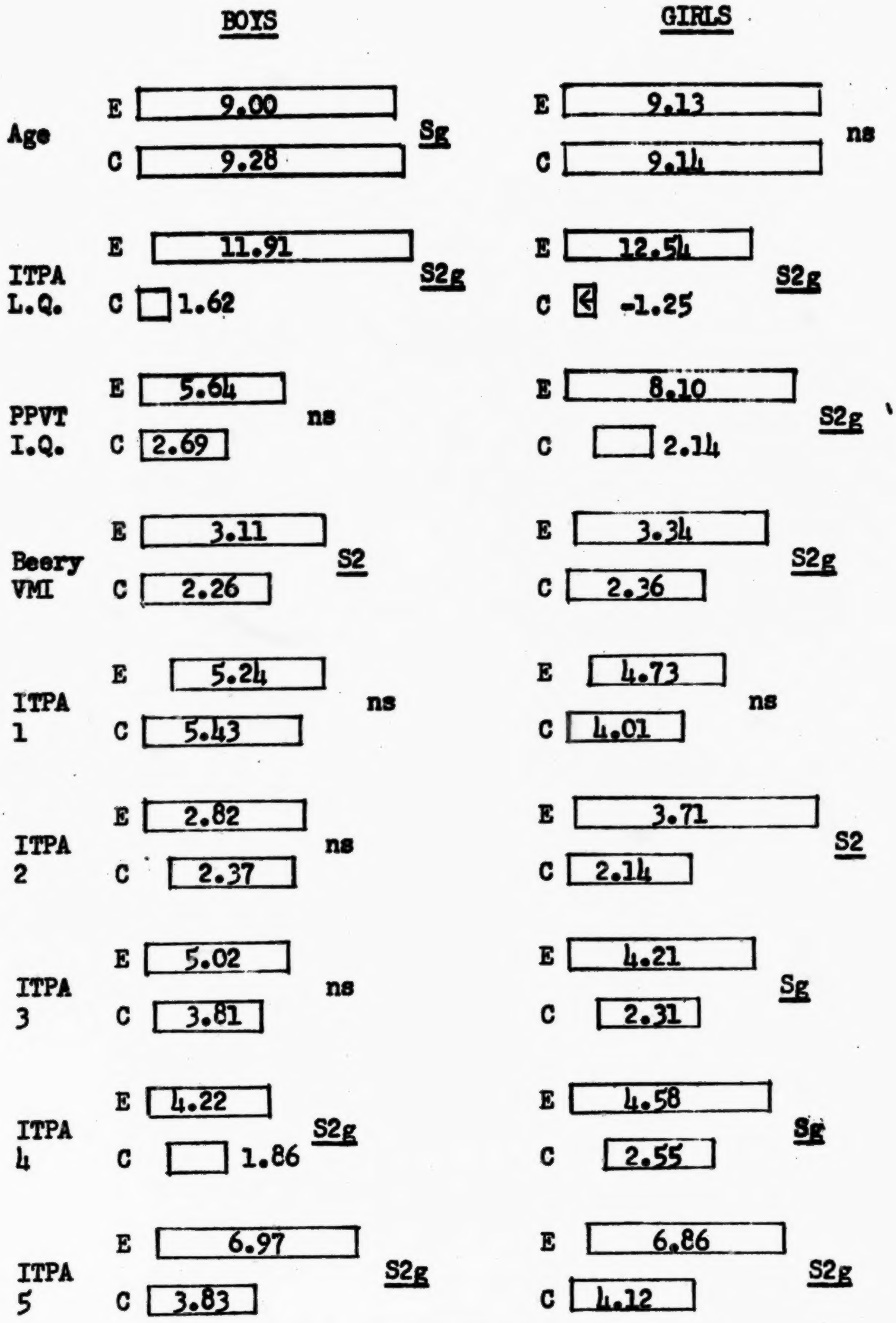

Figure 1. Growth Differences for the Total Experimental and Total Control Groups

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S2 - significant for posttest
Sg - significant for posttest-pretest
S2g - significant for both posttest and posttest-pretest
ns - not significant

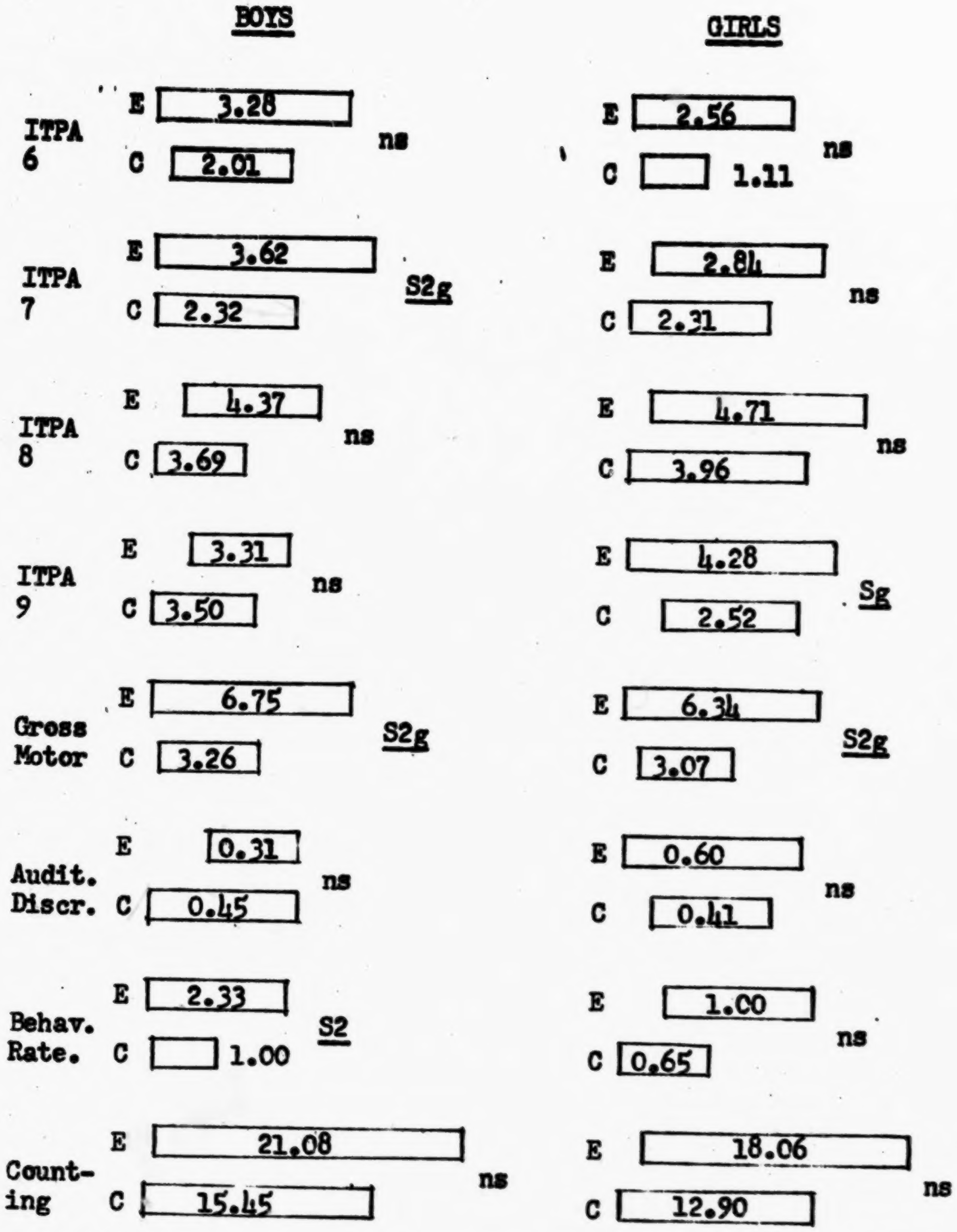

Figure 1. (continued)

Experimental with Control Subgroups Matched for Age, ITPA L.Q., PPVT I.Q., and Program Need.

In this analysis, only matched subgroups are compared: Motor (EM with CM), auditory (EA with CA), visual (EV with CV), language (EL with CL), retention (ER with CR), weak intact (EW with CW), and strong intact (EI with CI). The comparisens were made separately by sex. Chi square tests and significance of differences determined by univariate F and F prime tests for each variable are provided in Appendix E. For variables in which significances were found, further statistical data (Duncan's tests, t-tests, and subgroup means) are given in Appendix F.

Pretest Findings. Only one statistically significant difference was identified on the pretests. In this instance, EL boys excelled CL boys in ITPA 3--Auditory-Vocal Association. No significant differences were found for girls. (See Appendixes E-1, F-1, F-2.)

Posttest Findings. Statistically significant differences favoring experimental subgroups were identified in posttest analyses. Six significant differences favored subgroups of experimental boys over matched control boys on five test variables; four significant differences favored subgroups of experimental girls over matched control girls on four variables. Data are given in Table 5. (See also Appendixes E-2, F-3, F-4.)

Table 5. Significant Posttest Differences Among Matched Experimental and Control Subgroups

VARIABLE	BOYS SUBGROUPS	GIRLS SUBGROUPS
ITPA L.Q.	EL > CL EI > CI	EI > CI
Beery VMI	EM > CM	EW > CW
ITPA 5	EL > CL	EW > CW
ITPA 6	EI > CI	- - -
Gross Motor Observations	EW > CW	EM > CM

Posttest Minus Pretest Findings. Statistically significant differences favoring experimental subgroups were found in posttest minus pretest growth analyses. Four differences were significant favoring subgroups of experimental boys over matched control boys on three test variables; six significant differences favored experimental girls subgroups over matched control girls on four variables. Data are given in Table 6. (See also Appendixes E-3, F-5, F-6.)

Table 6. Significant Posttest Minus Pretest Differences Among Matched Experimental and Control Subgroups

VARIABLE	BOYS SUBGROUPS	GIRLS SUBGROUPS
ITPA L.Q.	EL > CL	EM > CM EW > CW
ITPA 3	---	EM > CM EL > CL
ITPA 5	EL > CL	EW > CW
Gross Motor Observations	EL > CL EW > CW	EM > CM

Experimental with Control Subgroups Not Matched for Program Need.

In this analysis, comparisons of experimental and control subgroups having different program needs were made (EM with CA, EM with CV, etc.). Boys and girls were compared separately. Chi square tests and significance of differences determined by univariate F and F prime tests for each variable are provided in Appendix E. For variables in which significant differences were found, further statistical data (Duncan's tests, t-tests, and subgroup means) are given in Appendix F.

Pretest Findings. Significant differences among the subgroups were expected because of the composition of the groups. Four of the subgroups (EI, CI, EW, CW) were each made up of children with no severe developmental lags. The pretest results clearly showed the superiority of EI and CI children and to a lesser degree that of the more average EW and CW children. Twenty-seven significant differences were identified favoring experimental boys subgroups over control boys; 26 significant differences were identified favoring control boys. For girls, experimental subgroups surpassed control subgroups in 40 instances; control subgroups surpassed experimental subgroups in 36 instances. Detailed data are provided in Table 7. A significant difference occurring on a pretest but not on a posttest (marked with an asterisk) indicates loss of pretest advantage. (See also Appendixes E-1, F-1, F-2.)

Table 7. Significant Pretest Differences Among Unmatched Experimental and Control Subgroups

Variable	Boys Groups	Girls Groups
ITPA L.Q.	E > C EV > CL EW > CL EI > CM EI > CV EI > CL EI > CW C > E CI > EM* CI > EA* CI > EV* CI > EL* CI > EW*	E > C EW > CL EI > CM EI > CV EI > CL EI > CR EI > CW C > E CW > EL* CI > EM* CI > EV* CI > EL* CI > EW*
PPVT I.Q.	ns	E > C EW > CL EI > CL C > E CW > EL* CI > EM* CI > EL*
Beery VMI	E > C EI > CM EI > CV EI > CW C > E CI > EM* CI > EV* CI > EW*	E > C EW > CM EW > CV EI > CM EI > CV EI > CR EI > CW C > E CI > EM* CI > EV* CI > EL*
ITPA 1	E > C EW > CA* C > E CI > EA	ns
ITPA 2	C > E CI > EV* CI > EL* CI > EW*	E > C EI > CV C > E CI > EL*
ITPA 3	E > C EV > CL* EW > CL EI > CL C > E CI > EM* CI > EA* CI > EL* CI > EW*	E > C EI > CM EI > CL EI > CW C > E CI > EM* CI > EV* CI > EL*
ITPA 4	ns	C > E CI > EM* CI > EL*
ITPA 5	E > C EV > CL EI > CM EI > CL EI > CW C > E CI > EA* CI > EL* CI > EW*	E > C EI > CM EI > CV EI > CL C > E CI > EM* CI > EL*
ITPA 6	E > C EI > CL EI > CW* C > E CI > EM* CI > EL* CI > EW*	E > C EI > CM EI > CV* C > E CI > EM* CI > EV*

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*No significant difference on posttest indicates loss of pretest advantage.

Table 7. (continued)

Variable	Boys Groups	Girls Groups	Variablé	Boys Groups	Girls Groups
ITPA 7	ns	E > C EI > CM EI > CV EI > CL EI > CR* EI > CW C > E CW > EL* CI > EM* CI > EV* CI > EL*	Gross Motor Observations	E > C EV > CM EL > CM EW > CM EI > CM C > E CL > EM* CW > EM* CI > EM*	E > C EV > CM EL > CM ER > CM* EW > CM EI > CM C > E CV > EM* CL > EM* CR > EM* CW > EM* CI > EM*
ITPA 8	ns	E > C EI > CM EI > CL EI > CR EI > CW C > E CI > EM CI > EV CI > ER*	Behavior Rating	E > C EI > CW* C > E CI > EM*	ns
ITPA 9	E > C EI > CV* EI > CL* EW > CL*	E > C EW > CM* EI > CM EI > CR* C > E CI > EM* CI > EV* CI > EL*	Total	E > C 27 C > E 26	E > C 40 C > E 36

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*No significant difference on posttest indicates loss of pretest advantage.

Posttest Findings. In contrast to pretest findings, posttest results showed a far larger number of statistically significant differences among test variables favoring the experimental subgroups. Differences which significantly favored boys experimental subgroups over the control boys occurred in 38 instances, while control boys surpassed experimental boys in only six instances. Significant differences favoring girls experimental subgroups over control girls occurred in 73 instances, while control girls surpassed experimental girls in only five instances. Table 8 gives the comparisons in detail. A significant difference occurring on a posttest but not on a pretest (marked with an asterisk) indicates a substantial increase in posttest performance. (See also Appendixes E-2, F-3, F-4.)

Posttest Minus Pretest Findings. Growth measured by posttest minus pretest differences, without exception, favored the experimental subgroups. Experimental boys showed significantly more growth than control boys in 19 instances; experimental girls showed significantly more growth than control girls in 25 instances. Table 9 gives the comparisons in detail. (See also Appendixes E-3, F-5, F-6.)

Table 8. Significant Posttest Differences among Unmatched Experimental and Control Subgroups

Variable	Boys Groups	Girls Groups
ITPA L.Q.	E > C EV > CL EW > CL EI > CM EI > CV EI > CL EI > CW	E > C EM > CV* EL > CV* EW > CM* EW > CV* EW > CL EI > CM EI > CA* EI > CV EI > CL EI > CR EI > CW
PPVT I.Q.	E > C EI > CM* EI > CL*	E > C EM > CL* EW > CL EI > CM* EI > CV* EI > CL EI > CW*
Beery VMI	E > C EV > CM* EL > CM* EW > CM* EI > CM EI > CV EI > CW	E > C EW > CM EW > CV EW > CL* EI > CM EI > CV EI > CL* EI > CR EI > CW C > E CI > ER*
ITPA 1	C > E CI > EM*	E > C EI > CM* EI > CA* EI > CV* EI > CW*
ITPA 2	ns	E > C EI > CA* EI > CV EI > CL*
ITPA 3	E > C EW > CL EI > CM* EI > CL	E > C EI > CM EI > CA* EI > CV* EI > CL EI > CW
ITPA 4	ns	E > C EA > CW* EA > CI* EW > CV* EI > CA* EI > CV* C > E CI > EV*
ITPA 5	E > C EA > CL* EV > CL EW > CL* EI > CM EI > CV* EI > CL EI > CW	E > C EL > CM* EW > CM* EW > CL* EI > CM EI > CV EI > CL EI > CW*
ITPA 6	E > C EI > CM* EI > CV* EI > CL	E > C EW > CM* EI > CM EI > CR* EI > CW*

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*No significant difference on pretest indicates a substantial increase in posttest performance.

Table 8. (continued)

Variable	Boys Groups	Girls Groups	Variable	Boys Groups	Girls Groups
ITPA 7	E > C EV > CM* EL > CM* EW > CM* EW > CL* EI > CM*	E > C EI > CM EI > CV EI > CL EI > CW	Auditory Discrim.	C > E CL > EA* CW > EM* CW > EA* CI > EM* CI > EA*	ns
ITPA 8	ns	E > C EI > CM EI > CV* EI > CL EI > CR EI > CW C > E CI > EM CI > EV CI > EL*			
ITPA 9	ns	E > C EI > CM EI > CA* EI > CV*			
Gross Motor Observation	E > C EV > CM EL > CM EL > CW* EW > CM EI > CM EI > CW*	E > C EV > CM EL > CM EW > CM EI > CM EI > CA* EI > CV* EI > CL* EI > CW*	Total	E > C 38 C > E 6	E > C 73 C > E 5

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*No significant difference on pretest indicates a substantial increase in posttest performance.

Table 9. Significant Posttest Minus Pretest Differences among Unmatched Experimental and Control Subgroups

Variable	Boys Groups	Girls Groups	Variable	Boys Groups	Girls Groups
ITPA L.Q.	E > C EA > CI EV > CI EL > CM EL > CV EL > CW EL > CI EW > CI	E > C EM > CW EM > CI EL > CM EL > CW EL > CI EW > CV EW > CI EI > CA	ITPA 9	ns	E > C EL > CW EW > CA EI > CA
Beery VMI	E > C EV > CM EW > CM	ns	Gross Motor Observations	E > C EM > CL EM > CW EM > CI EL > CW EL > CI	E > C EM > CV EM > CR EM > CW EM > CI EL > CW
ITPA 3	ns	E > C EM > CI EL > CM EL > CW EL > CI			
ITPA 5	E > C EA > CL EA > CI EL > CV EL > CI EW > CI	E > C EL > CM EL > CW EW > CM EW > CV EW > CI	Total	E > C 19 C > E 0	E > C 25 C > E 0

Significant differences favoring experimental and control groups on the pretest, posttest, and posttest minus pretest are summarized in Table 10.

Table 10. Number of Significant Pretest, Posttest, and Posttest Minus Pretest Differences in Test Variables between Unmatched Experimental and Control Subgroups

Test	BOYS		GIRLS	
	E > C	C > E	E > C	C > E
Pretest	27	26	40	36
Posttest	38	6	73	5
Posttest Minus Pretest	19	0	25	0

Among the posttest findings, the figures 38 and 73 do not necessarily indicate the undisputed superiority of the experimental group over the control group as this superiority may have been reflected first on the pretests. Table 11 provides a more accurate look at improvement, with pretest superiority being taken into consideration.

Table 11. Number of Test Variables in which Experimental and Control Subgroups Showed Substantial Improvement

Indicated Equality or Superiority of Groups			
Pretest	Posttest	Boys	Girls
EXPERIMENTAL SUBGROUPS IMPROVED			
C > E	E = C	26[a]	34[a]
E = C	E > C	18[b]	38[b]
C > E	E > C	0	0
Total		44	72
CONTROL SUBGROUPS IMPROVED			
E > C	E = C	7[a]	5[a]
E = C	C > E	6[b]	3[b]
E > C	C > E	0	0
Total		13	8

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[a] Groups marked by an asterisk on Table 7.

[b] Groups marked by an asterisk on Table 8.

Briefly, significant improvement was shown by various subgroups of experimental boys in a total of 44 instances, by experimental girls in a total of 72 instances. Various control subgroups of boys improved only in 13 instances, girls only in 8 instances.

Unmatched Experimental Subgroups.

In this analysis, comparisons among unmatched experimental subgroups were made separately by sex (EM with EA, EM with EV, etc.), resulting in a number of significant differences among subgroups. Chi square tests and significance of differences determined by univariate F and F prime tests are given in Appendix E. For variables in which significant differences were found, further statistical analyses (Duncan's tests, t-tests, and subgroup means) are provided in Appendix F.

Pretest Findings. Three experimental subgroups of boys surpassed five other experimental subgroups of boys in a total of 19 instances; four experimental subgroups of girls surpassed five other experimental subgroups of girls in a total of 33 instances. Table 12 provides detailed comparisons. (See also Appendixes E-1, F-1, F-2.) A significant difference occuring on a pretest but not on a posttest (marked with an asterisk) indicates loss of pretest advantage. Table 13, summarizing these data, shows that boys in the strong intact subgroup (EI) surpassed boys in the other subgroups a total of 13 times and were not surpassed by any other subgroup. Girls in the strong intact subgroup (EI) surpassed girls in the other subgroups a total of 28 times and also were not surpassed by any other subgroup. Girls in the EA subgroup neither surpassed nor were surpassed by girls in any other subgroup.

Posttest Findings. Boys in three experimental subgroups surpassed boys in five other experimental subgroups in 11 instances. One subgroup of experimental girls (EI) surpassed girls in five other experimental subgroups in 15 instances. As on the pretests, girls in the EA subgroup neither surpassed nor were surpassed by girls in any other group.

Table 14 provides detailed comparisons. (See also Appendixes E-2, F-3, F-4.) A significant difference occurring on a posttest but not on a pretest (marked by an asterisk) indicates a substantial increase in posttest performance. A summary in Table 15 shows that only EI boys were unsurpassed by other subgroups. Experimental subgroups of boys most often surpassed by boys in other subgroups beginning with the subgroup most often surpassed were Em-4, EA-3, EW-2, EV-1, EL-1. EA and EI girls were unsurpassed by girls in other subgroups. Experimental subgroups of girls most often surpassed by girls in other subgroups were EM-7, EV-4, EL-2, ER-1, EW-1.

Table 12. Significant Pretest Differences among Unmatched Experimental Subgroups

Variable	Boys Groups	Girls Groups
ITPA L.Q.	EW > EA* EW > EL* EI > EV* EI > EL* EI > EW	EI > EM EI > EV EI > EL* EI > EW*
PPVT I.Q.	ns	EI > EL*
Beery VMI	EI > EV* EI > EW*	EW > EV* EI > EM EI > EV
ITPA 2	ns	EI > EL*
ITPA 3	EI > EA*	EI > EM EI > EV EI > EL* EI > ER*
ITPA 5	EV > EL* EW > EL* EI > EL*	EI > EM* EI > EL*
ITPA 6	EI > EM EI > EL EI > EW	EI > EM*
ITPA 7	ns	EW > EL* EI > EM EI > EV* EI > EL
ITPA 8	ns	EI > EM EI > EV EI > ER* EI > EW
ITPA 9	EI > EL*	EI > EM EI > EV* EI > EL* EI > ER*
Gross Motor Observations	EV > EM* EW > EM* EI > EM*	EV > EM* EL > EM* EW > EM* EI > EM EI > EL*
Behavior Rating	EI > EM*	ns

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*No significant difference on posttest indicates loss of pretest advantage.

Table 13. Number of Significant Pretest Differences among Unmatched Experimental Subgroups

Superior Subgroup	Subgroup Surpassed by Other Experimental Subgroup							
	EM	EA	EV	EL	ER	EW	EI	Total
				BOYS				
EM >								0
EA >								0
EV >	1			1				2
EL >								0
ER >	No boys so classified							
EW >	1	1		2				4
EI >	3	1	2	4		3		13
Total	5	2	2	7	-	3	0	19
				GIRLS				
EM >								0
EA >								0
EV >	1							1
EL >	1							1
ER >								0
EW >	1		1	1				3
EI >	9		6	8	3	2		28
Total	12	0	7	9	3	2	0	33

Table 14. Significant Posttest Differences among Unmatched Experimental Subgroups

Variable	Boys Groups	Girls Groups	Variable	Boys Groups	Girls Groups
ITPA L.Q.	EI > EW	EI > EM EI > EV	Gross Motor Observations	ns	EI > EM
Beery VMI	ns	EI > EM EI > EV EI > ER*	Auditory Discrim.	EL > EM* EL > EA* EW > EM* EW > EA* EI > EM* EI > EA*	ns
ITPA 1	ns	EI > EW*			
ITPA 3	ns	EI > EM EI > EV			
ITPA 6	EI > EM EI > EV* EI > EL EI > EW	ns			
ITPA 7	ns	EI > EM EI > EL			
ITPA 8	ns	EI > EM EI > EV EI > EL*			
ITPA 9	ns	EI > EM			

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*No significant difference on pretest indicates a substantial increase on posttest performance.

Table 15. Number of Significant Posttest Differences among Unmatched Experimental Subgroups

Superior Subgroup	Subgroup Surpassed by Other Experimental Subgroup							
	EM	EA	EV	EL	ER	EW	EI	Total
				BOYS				
EM >								0
EA >								0
EV >								0
EL >	1	1						2
ER >	No boys so classified							
EW >	1	1						2
EI >	2	1	1	1		2		7
Total	4	3	1	1	-	2	0	11
				GIRLS				
EM >								0
EA >								0
EV >								0
EL >								0
ER >								0
EW >								0
EI >	7		4	2	1	1		15
Total	7	0	4	2	1	1	0	15

Posttest Minus Pretest Findings. Boys in two experimental subgroups (EA, EL) showed significantly greater growth than boys in three other subgroups (EM, EW, EI) in five instances. Girls in three experimental subgroups (EM, EL, EW) showed significantly greater growth than girls in subgroups EW, EI in seven instances. Table 16 shows the tests and subgroups in which significant differences were found in posttest minus pretest analyses. Table 17 indicates which subgroups surpassed other subgroups. (See also Appendixes E-3, F-5, F-6.)

Table 16. Test Variables Showing Significant Posttest Minus Pretest Differences among Unmatched Experimental Subgroups

Variable	Boys Groups	Girls Groups
ITPA L.Q.	EA > EW EA > EI EL > EM EL > EW EL > EI	EL > EI
ITPA 3	ns	EM > EI EL > EW EL > EI
ITPA 5	ns	EW > EI
Gross Motor Observations	ns	EM > EW EM > EI

Table 17. Number of Significant Posttest Minus Pretest Differences among Unmatched Experimental Subgroups

Superior Subgroup	Subgroup surpassed by Other Experimental Subgroup							
	EM	EA	EV	EL	ER	EW	EI	Total
				BOYS				
EM >								0
EA >						1	1	2
EV >								0
EL >	1					1	1	3
ER >	No boys so classified							
EW >								0
EI >								0
Total	1	0	0	0	-	2	2	5
				GIRLS				
EM >						1	2	3
EA >								0
EV >								0
EL >						1	2	3
ER >								0
EW >							1	1
EI >								0
Total	0	0	0	0	0	2	5	7

Prekindergarten Experiment, First Year (Phase I), and Prekindergarten Field Test, First Year (Phase II), Compared.

Findings of Phase II of the study are similar to those of Phase I as shown by the results of the posttest and the posttest minus pretest comparisons of experimental and control groups for boys and girls in both completed phases of the study.

Posttest Phase I and Phase II Comparison for Boys. Posttest findings for boys, reported in Table 18, showed a statistically significant difference favoring the experimental group on five variables in both phases. Of these, there were two measures of cognition (ITPA L.Q. and ITPA 4), one measure of visual skill (Beery VMI), one measure of expression (ITPA 5), and one measure of motor skill (Phase I: Total Motor Test; Phase II: Gross Motor Observations). One significant difference favoring a control group occurred in Phase I in a measure of retention (ITPA 8). No significant difference in favor of the control group occurred in Phase II on posttests. All variables which were significant for experimental boys during Phase I were also significant in Phase II. However, two additional variables were significant in Phase II which were not significant in Phase I. One is a measure of language (ITPA 7), and the other is an assessment of behavior (Behavior Rating Scale). (Behavior was not studied in Phase I.) Thus, in a total of seven variables, differences significantly favored experimental boys in Phase II compared with five significant differences in Phase I. The only variable significantly favoring control boys appeared in Phase I results.

Posttest Phase I and Phase II Comparison for Girls. The posttest findings in Table 18 showed a significant difference in three variables favoring the experimental group in both phases: one measure of visual skill (Beery VMI), one measure of expression (ITPA 5), and one measure of motor skill (Phase I: Total Motor Test; Phase II: Gross Motor Observations). Every variable which significantly favored the experimental group in Phase I was also significantly in favor of the experimental group in Phase II; however, three additional variables reached a level of significance on the Phase II posttest: **two measures** of cognition (ITPA L.Q., PPVT I.Q.), and a second measure of visual skill (ITPA 2). Thus, in a total of six variables, differences significantly favored the experimental girls on posttests in Phase II — **twice as many** as were significant in Phase I. No significant differences appeared in either Phase I or Phase II posttests favoring the control groups.

Table 18. Posttest Comparisons Between Experimental (E) and Control (Cn, Co) Groups in Phase I and Phase II

Variable	BOYS		GIRLS	
	Phase I	Phase II	Phase I	Phase II
Age	ns[1]	ns	ns	ns
ITPA L.Q.	E > Cn[2] E > Co[3]	E > C	ns	E > C
PPVT I.Q.	ns	ns	ns	E > C
Beery VMI	E > Co	E > C	E > Cn E > Co	E > C
ITPA 1	ns	ns	ns	ns
ITPA 2	ns	ns	ns	E > C
ITPA 3	ns	ns	ns	ns
ITPA 4	E > Cn E > Co	E > C	ns	ns
ITPA 5	E > Cn E > Co	E > C	E > Cn E > Co	E > C
ITPA 6	ns	ns	ns	ns
ITPA 7	ns	E > C	ns	ns
ITPA 8	Cn > E	ns	ns	ns
ITPA 9	ns	ns	ns	ns
Total Motor / Gross Motor	E > Cn E > Co	E > C	E > Cn E > Co	E > C
Auditory Discrimination	ns	ns	ns	ns
Behavior Rating	--	E > C	--	ns
Counting	--	ns	--	ns

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[1] ns - not significant

[2] Cn - Control group with nursery school experience

[3] Co - Control group without school experience

Posttest Minus Pretest Phase I and Phase II Comparison for Boys. Three variables in which significant differences favored the experimental group of boys in Phase I also favored experimental boys in Phase II as shown in Table 19. Two of them were measures of cognition (ITPA L.Q. and ITPA 4) and one was a measure of expression (ITPA 5). One motor expressive measure (ITPA 6) for experimental boys was significant in Phase I but was not significant in Phase II. A language measure (ITPA 7) and a measure of motor skills (Phase I: Total Motor Test; Phase II: Gross Motor Observations) showed significant differences favoring experimental boys in Phase II but not in Phase I. Thus, a total of five variables significantly favored experimental boys in Phase II as compared with four variables in Phase I. No significant differences favored control boys in Phase I, and the only significant difference favoring control boys in Phase II was age, this difference resulting from early testing of three experimental boys who were moving from the area.

Posttest Minus Pretest Phase I and Phase II Comparison for Girls. Six variables in which differences significantly favored the experimental group of girls in Phase I also favored experimental girls in Phase II. Of the six, two were measures of cognition (ITPA L.Q., PPVT I.Q.), and the others were: one measure of visual skill (Beery VMI), one measure of expression (ITPA 5), one measure of retention (ITPA 9), and one measure of motor skill (Phase I: Total Motor Test; Phase II: Gross Motor Observations). Two variables, one a measure of auditory comprehension (ITPA 1) and the other a measure of motor expression (ITPA 6), showed significant differences in Phase I, but not in Phase II. Two measures of cognition (ITPA 3, ITPA 4) showed a significant difference in Phase II, but not in Phase I. Thus, a total of eight variables favored the experimental group for each phase at a statistically significant level. The control group of girls showed no significant differences on posttest minus pretest results for either phase of the study.

Table 19. Posttest minus Pretest Comparisons Between Experimental (E) and Control (Cn, Co) Groups in Phase I and Phase II

Variable	BOYS		GIRLS	
	Phase I	Phase II	Phase I	Phase II
Age	ns[1]	C > E	ns	ns
ITPA L.Q.	E > Co[2]	E > C	E > Co	E > C
PPVT I.Q.	ns	ns	E > Cn* E > Co*	E > C
Beery VMI	ns	ns	E > Cn E > Co	E > C
ITPA 1	ns	ns	E > Co	ns
ITPA 2	ns	ns	ns	ns
ITPA 3	ns	ns	ns	E > C
ITPA 4	E > Co*	E > C	ns	E > C
ITPA 5	E > Cn[3] E > Co	E > C	E > Cn E > Co	E > C
ITPA 6	E > Cn E > Co	ns	E > Co*	ns
ITPA 7	ns	E > C	ns	ns
ITPA 8	ns	ns	ns	ns
ITPA 9	ns	ns	E > Co*	E > C
Total Motor / Gross Motor	ns	E > C	E > Co	E > C
Auditory Discrimination	ns	ns	ns	ns
Behavior Rating	--	ns	--	ns
Counting	--	ns	--	ns

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[1] ns - not significant

[2] Co - Control group without school experience

[3] Cn - Control group with nursery school experience

*Significant only when computing each class separately (Em, Ea, Ev, El) with total groups E, Cn, Co.

Prekindergarten Experiment, Second Year

Data from pretests, posttests, posttests minus pretests, and the end-of-year readiness tests of the experimental (E) and two control (Cn, Co) groups were compared separately by sex. In each instance, the Wilk's lambda criterion indicated no statistically significant difference among any of the groups. Therefore, any differences among test variables, if found, would be likely to be significant only by chance. The data are reported in Table 20.

Table 20. Wilk's Lambda Criteria and Univariate F Tests of Significance by Sex

Variable	Wilk's Lambda Criterion	Significance	Univariate F Test	Significance
BOYS				
PRETEST				
Age, 2 control, 12 dependent variables	.616	ns	.088 to .994	ns
POSTTEST				
Age, 2 control, 13 dependent variables	.909	ns	.223 to .977	ns
ITPA 1			.027	sig.*
POSTTEST MINUS PRETEST				
Age, 2 control, 12 dependent variables	.743	ns	.162 to .973	ns
READINESS				
7 dependent variables	.777	ns	.298 to .783	ns
GIRLS				
PRETEST				
Age, 2 control, 12 dependent variables	.993	ns	.118 to .990	ns
POSTTEST				
Age, 2 control, 13 dependent variables	.634	ns	.063 to .902	ns
POSTTEST MINUS PRETEST				
Age, 2 control, 12 dependent variables	.521	ns	.064 to .999	ns
ITPA 5			.047	sig.*
READINESS				
7 dependent variables	.619	ns	.344 to .935	ns
Copying Test			.021	sig.*

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*Probable chance significance.

Although of no scientific interest, the pretest, posttest, posttest minus pretest, and readiness test means were examined to determine the number of times the means of each group excelled one or both of the other groups. Complete data are given in Appendix G. Table 21 summarizes these figures.

Table 21. Frequency in which the Mean Scores of Each Group Excelled One or Both Remaining Groups

	E > Cn	E > Co	Cn > E	Cn > Co	Co > E	Co > Cn
BOYS						
Pretest	7	12	6	10	1	4
Posttest	9	10	4	10	1	3
Posttest Minus Pretest	9	5	4	5	8	9
Readiness	3	7	4	5	0	2
GIRLS						
Pretest	8	5	5	5	8	8
Posttest	11	10	2	5	4	7
Posttest Minus Pretest	10	9	3	6	4	5
Readiness	6	5	1	5	2	1

CONCLUSIONS

Results of the second year of the study at the prekindergarten level show that children who participated in the experimental classes made significantly greater gains on nine measures of development than the control group. Gains made by the control group were in no instance significantly greater than gains made by the experimental group. Experimental boys showed significantly more growth in measures of cognition, language, and motor skills. Experimental girls surpassed control girls in all measures of cognition, and in one measure of visual skill, language, retention, and motor skills.

The effectiveness of the program also seems apparent when experimental and control groups are compared for highest obtained scores. For boys the program appeared to have a positive effect upon visual skills, language skills, motor skills, cognition and behavior, as they scored significantly higher than the control boys. Experimental girls scored higher than control girls in visual skills, language, motor skills, and cognition. (In each of the thirty-two comparisons made, the experimental group scored higher than the control group, with one exception, auditory discrimination, on which the experimental and control boys were equal. Thirteen of these comparisons were statistically significant.)

Experimental subgroups of boys with specific program needs when compared with control subgroups of boys scored higher on measures of visual skills, language skills, motor skills, and cognition. Experimental subgroups of girls with specific program needs scored higher than control groups of girls on measures of visual skills, language skills, and cognition. In growth, the language program seemed to have made the greatest impact in the target area for boys, while the motor and cognition programs had a greater influence upon the girls in the area specifically programmed.

In general, the findings again showed that experimental subgroups of children who seemed least competent on a particular measure on the initial assessment made the most gain during the year on that specific measure. This finding points up the importance of early identification of specific developmental needs and the matching of teaching methods to the child's developmental level for optimal progress.

Experimental subgroups of prekindergarten children also made significant gains in areas not specifically programmed. This may have resulted from the impact of the total program or it might be that strengthening one developmental skill influences performance in other skill areas and in the area of cognition.

Findings from the prekindergarten studies in both years are very similar, as the programs of each year seemed to have improved language, motor skills, and cognition for boys and visual skills, language, motor skills and cognition for girls. In both years, the girls seemed to profit more than boys from the program. However, in Phase II more variables measuring cognition reached a significant level for the experimental group. Also, more variables significantly favored Phase II experimental boys than Phase I experimental boys.

At the end of the kindergarten year, the differences between the experimental and control groups found in the prekindergarten year were not maintained at a significant level of confidence. This would tend to support findings summarized by Hess and Bear (17) of Kirk-1958, Gray and Klaus-1965, Deutch-1965, and Weikart-1964, that the control groups tend to gain once they are exposed to stimulating school experiences. However, all incoming University City kindergarten children were given a screening battery of assessment tests and program recommendations which were reported to all teachers for use in planning for each child. Control children with specific developmental lags being identified by this traditional screen may also have influenced the results at the kindergarten level.

Findings for Phase II again, as in Phase I, support, in part, the first hypothesis that prekindergarten children who are provided with a personalized program based on individual assessment of their developmental skills will increase their intellectual abilities, and will learn at a higher level than children without this program.

Findings for Phase II did not support the second hypothesis that the same prekindergarten children will retain their superiority through kindergarten.

Will the developmental skills prekindergarten experience have any positive effect on later success in school? This is a question which will have to wait until Phase III of the study is completed and the experimental and control children will have experienced more formal kinds of learning.

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Table A-1. Description of the Assessment Battery and Major Skill Measured by Each Test

DESCRIPTION OF ASSESSMENT BATTERY	Variable	Major Developmental Skill[1]					Cognition
		M	A	V	L	R	
ILLINOIS TEST OF PSYCHOLINGUISTIC ABILITIES (ITPA). TOTAL ITPA I.Q. Composite Score derived from chronological age and total standard score.	C[2]						x
PEABODY PICTURE VOCABULARY TEST, I.Q. The ability to indicate the meaning of a spoken word by designating one of four pictures.	C						x
BEERY: DEVELOPMENTAL TEST OF VISUAL-MOTOR INTEGRATION (VMI). The perception of and ability to reproduce simple geometric forms.	D[3]	x		x			
ITPA DECODING TESTS. Understanding the meaning of words and symbols.							
Test 1. Auditory Decoding. The ability to comprehend the spoken word.	D		x				
Example: Do airplanes fly? Yes, No Do bicycles drink? Yes, No							
Test 2. Visual Decoding. The ability to comprehend pictures.	D			x			
Example: Picture of shoe - Find another (different) shoe.							
ITPA ASSOCIATION TESTS. Relating visual or auditory symbols (ideas) in meaningful ways.							
Test 3. Auditory-Vocal Association. The ability to relate spoken words in a meaningful way.	D						x
Example: I sit on chair - I sleep on _____. Coffee is bitter - Sugar is _____.							
Test 4. Visual-Motor Association. The ability to relate meaningfully visual symbols.	D						x
Example: Sock goes with shoe, cup goes with spoon.							

---

[1] M-motor, A-auditory, V-visual, L-language, R-retention.

[2] C- Control variable

[3] D- Dependent variable

Table A-1. (continued)

DESCRIPTION OF ASSESSMENT BATTERY	Variable	Major Developmental Skill					Cognition
		M	A	V	L	R	
ITPA ENCODING TESTS. Putting ideas into words and gestures.							
Test 5. Vocal Encoding. The ability to express ideas in spoken words.	D				x		
Example: Tell all about a - - - Ball, chalk, block, celluloid.							
Test 6. Motor Encoding. The ability to express one's ideas in gestures.	D	x					
Example: Gun - point, pull trigger. Telephone - dial, put to ear.							
ITPA AUTOMATIC TESTS. Handling syntactical and inflectional aspects of language without conscious effort.							
Test 7. Auditory-Vocal Automatic Test. The ability to anticipate what will be said based on what has already been said.	D				x		
Example: Here is a bed, here are two beds.							
ITPA SEQUENCING TESTS. Reproducing a sequence of symbols.							
Test 8. Auditory-Vocal Sequencing. The ability to repeat a sequence of symbols previously heard.	D					x	
Example: Repeating 2 to 8 digits.							
Test 9. Visual-Motor Sequencing. The ability to reproduce a sequence of symbols previously seen.	D					x	
Example: △ □ ○ ⬡ etc.							

Table A-1. (continued)

DESCRIPTION OF ASSESSMENT BATTERY	Variable	Major Developmental Skill					Cognition
		M	A	V	L	R	
GROSS MOTOR OBSERVATIONS, Items 1-8.* Body control and balance. Ability to jump on each foot, jump in one position, skip, and walk a balance beam forward and backward.	D	x					
THREE-DIMENSIONAL AUDITORY DISCRIMINATION TEST.* Using toy objects. Example: This is mouse; this is house. Give me house.	D		x				
COUNTING. Ability to count consecutively from 1 to 101.	D					x	
BEHAVIOR RATING.* Examiner's subjective estimate of child's reactions.	D	INTRA-INTERPERSONAL RELATIONS					
METROPOLITAN READINESS TESTS, FORM B. Readiness for the first primary year. Example: Tests include: 1. Word Meaning; 2. Listening; 3. Matching; 4. Alphabet; 5. Numbers; 6. Copying; 7. Composite Score.	D	READINESS					

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*Instrument and norms derived locally.

APPENDIX B

ITPA Standard Deviations (S.D.) and Language Quotients (L.Q.) Extrapolated above the Published Norms

The authors of the Illinois Tests of Psycholinguistic Abilities (ITPA) published standard scores from approximately -3.00 to +3.00 and language age scores (L.A.) for the total test from two years, six months to nine years, four months. Standard scores are referred to as standard deviations (S.D.), in this report. Higher standard deviations (S.D.) and language quotients (L.Q.) may be determined from Table B-1 which was extrapolated from data in Table D of the examiners Manual (8), using a standard deviation of approximately 16 L.Q. points.

Table B-1.
ITPA Standard Deviations (S.D.) and Language Quotients (L.Q.) Extrapolated above the Published Norms

Raw Score	3-9-0 to 4-2-31		Raw Score	3-9-0 to 4-2-31		Raw Score	4-3-0 to 4-8-31		Raw Score	4-3-0 to 4-8-31	
	S.D.	L.Q.		S.D.	L.Q.		S.D.	L.Q.		S.D.	L.Q.
173	4.19	167	201			173	3.70	159	201	5.04	181
172	4.14	166	200			172	3.65	158	200	4.99	180
171	4.10	166	199			171	3.60	158	199	4.94	179
170	4.05	165	198			170	3.55	157	198	4.89	178
169	4.00	164	197			169	3.51	156	197	4.85	178
168	3.96	163	196			168	3.46	155	196	4.80	177
167	3.92	162	195			167	3.41	155	195	4.75	176
166	3.87	162	194			166	3.36	154	194	4.70	175
165	3.83	161	193			165	3.32	153	193	4.66	175
164	3.78	160	192			164	3.27	152	192	4.61	174
163	3.74	160	191	5.00	180	163	3.22	152	191	4.56	173
162	3.69	159	190	4.95	179	162	3.17	151	190	4.51	172
161	3.65	158	189	4.91	179	161	3.12	150	189	4.46	171
160	3.60	158	188	4.86	178	160	3.08	149	188	4.42	171
159	3.56	157	187	4.82	177	159	3.03	148	187	4.37	170
158	3.51	156	186	4.77	176	158	2.98	148	186	4.32	169
157	3.47	156	185	4.72	176	157			185	4.27	168
156	3.42	155	184	4.68	175	156			184	4.22	168
155	3.38	154	183	4.64	174	155			183	4.18	167
154	3.33	153	182	4.59	173	154			182	4.13	166
153	3.29	153	181	4.55	173	153			181	4.08	165
152	3.24	152	180	4.50	172	152			180	4.03	164
151	3.20	151	179	4.46	171	151			179	3.99	164
150	3.15	150	178	4.41	171	150			178	3.94	163
149	3.11	150	177	4.37	170	149			177	3.89	162
148	3.06	149	176	4.32	169	148			176	3.84	161
147	3.02	148	175	4.28	168	147			175	3.79	161
146	2.97	148	174	4.23	168	146			174	3.75	160

See next page.

This Table is based on a standard deviation of approximately 16 L.Q. points.

(Table B-1 continued)

Raw Score	4-9-0 to 5-2-31		Raw Score	4-9-0 to 5-2-31		Raw Score	5-3-0 to 5-8-31		Raw Score	5-3-0 to 5-8-31	
	S.D.	L.Q.		S.D.	L.Q.		S.D.	L.Q.		S.D.	L.Q.
204	4.85	178	240			204	3.47	156	240	5.03	180
203	4.79	177	239			203	3.43	155	239	4.99	180
202	4.74	176	238			202	3.38	154	238	4.94	179
201	4.69	175	237			201	3.34	154	237	4.90	178
200	4.63	174	236			200	3.30	153	236	4.86	178
199	4.58	173	235			199	3.25	152	235	4.81	177
198	4.52	172	234			198	3.21	151	234	4.77	176
197	4.47	172	233			197	3.17	151	233	4.73	176
196	4.41	171	232			196	3.12	150	232	4.68	175
195	4.36	170	231			195	3.08	149	231	4.64	174
194	4.30	169	230			194	3.04	149	230	4.60	174
193	4.25	168	229			193	2.99	148	229	4.55	173
192	4.19	167	228			192	2.95	147	228	4.51	172
191	4.14	166	227			191			227	4.47	172
190	4.09	165	226			190			226	4.42	171
189	4.03	164	225			189			225	4.38	170
188	3.98	164	224			188			224	4.34	170
187	3.92	163	223			187			223	4.29	169
186	3.87	162	222			186			222	4.25	168
185	3.81	161	221			185			221	4.21	167
184	3.76	160	220			184			220	4.16	167
183	3.70	159	219			183			219	4.12	166
182	3.65	158	218			182			218	4.08	165
181	3.59	157	217			181			217	4.03	164
180	3.54	157	216			180			216	3.99	164
179	3.49	156	215			179			215	3.95	163
178	3.43	155	214			178			214	3.90	162
177	3.38	154	213			177			213	3.86	162
176	3.32	153	212			176			212	3.82	161
175	3.27	152	211			175			211	3.77	160
174	3.21	151	210			174			210	3.73	160
173	3.16	151	209			173			209	3.69	159
172	3.10	150	208			172			208	3.64	158
171	3.05	149	207	5.01	180	171			207	3.60	158
170	2.99	148	206	4.96	179	170			206	3.56	157
169	2.94	147	205	4.90	178	169			205	3.51	156

This Table is based on a standard deviation of approximately 16 L.Q. points.

Table C-1. Chi Square, Univariate F, and Univariate F Prime Tests of Pretest Differences for the Total Experimental and Total Control Groups by Sex

Variable	BOYS			GIRLS		
	Chi Square	Univariate		Chi Square	Univariate	
		F	F'*		F	F'*
Age	ns	ns		ns	ns	
ITPA L.Q.	ns	ns		ns	ns	
PPVT I.Q.	ns	ns		> .02		ns
Beery VMI r.s.	ns	ns		ns	ns	
ITPA 1 r.s.	ns	ns		ns	ns	
ITPA 2 r.s.	ns	ns		ns	ns	
ITPA 3 r.s.	> .05		ns	ns	ns	
ITPA 4 r.s.	ns	ns		ns	ns	
ITPA 5 r.s.	ns	ns		ns	ns	
ITPA 6 r.s.	ns	ns		ns	ns	
ITPA 7 r.s.	ns	ns		ns	ns	
ITPA 8 r.s.	> .05		ns	ns	ns	
ITPA 9 r.s.	ns	ns		ns	ns	
Gross Motor Observations r.s.	ns	ns		ns	ns	
Auditory Discrim. r.s.	> .02		ns	ns	ns	
Behavior Rating r.s.	ns	ns		ns	ns	
Counting	ns	ns		ns	ns	

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*If the Chi Square test is significant, the F Prime test is used.

Table C-2. Chi Square, Univariate F, and Univariate F Prime Tests of Posttest Differences for the Total Experimental and Total Control Groups by Sex

	BOYS			GIRLS		
		Univariate			Univariate	
Variable	Chi Square	F	F'*	Chi Square	F	F'*
Age	ns	ns		ns	ns	
ITPA L.Q.	ns	>.005		ns	>.005	
PPVT I.Q.	ns	ns		>.01		>.05
Beery VMI r.s.	>.02		>.05	ns	>.01	
ITPA 1 r.s.	ns	ns		ns	ns	
ITPA 2 r.s.	ns	ns		ns	>.005	
ITPA 3 r.s.	ns	ns		ns	ns	
ITPA 4 r.s.	ns	>.025		ns	ns	
ITPA 5 r.s.	ns	>.005		ns	>.005	
ITPA 6 r.s.	ns	ns		ns	ns	
ITPA 7 r.s.	>.01		>.025	ns	ns	
ITPA 8 r.s.	ns	ns		ns	ns	
ITPA 9 r.s.	>.05		ns	>.01		ns
Gross Motor Observations r.s.	ns	>.005		>.001		>.005
Auditory Discrim. r.s.	ns	ns		ns	ns	
Behavior Rating r.s.	>.01		>.05	ns	ns	
Counting	ns	ns		ns	ns	

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*If the Chi Square test is significant, the F Prime test is used.

Table C-3. Chi Square, Univariate F, and Univariate F Prime Tests of Posttest Minus Pretest Differences for the Total Experimental and Total Control Groups by Sex

	BOYS			GIRLS		
		Univariate			Univariate	
Variable	Chi Square	F	F'*	Chi Square	F	F'*
Age	>.01		>.05	ns	ns	
ITPA L.Q.	ns	>.005		ns	>.005	
PPVT I.Q.	>.05		ns	ns	>.005	
Beery VMI r.s.	ns	ns		ns	>.01	
ITPA 1 r.s.	ns	ns		ns	ns	
ITPA 2 r.s.	ns	ns		ns	ns	
ITPA 3 r.s.	ns	ns		ns	>.005	
ITPA 4 r.s.	ns	>.05		ns	>.05	
ITPA 5 r.s.	ns	>.005		ns	>.025	
ITPA 6 r.s.	ns	ns		ns	ns	
ITPA 7 r.s.	ns	>.05		ns	ns	
ITPA 8 r.s.	ns	ns		ns	ns	
ITPA 9 r.s.	ns	ns		ns	>.05	
Gross Motor Observations r.s.	ns	>.005		ns	>.005	
Auditory Discrim. r.s.	>.05		ns	ns	ns	
Behavior Rating r.s.	ns	ns		ns	ns	
Counting	ns	ns		>.02		ns

---

*If the Chi Square test is significant, the F Prime test is used.

②

Table D-1. Significant Posttest Differences between the Total Experimental and Total Control Groups by Sex

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
B O Y S					
ITPA L.Q.	E > C	>.001	>.01	122.55	111.37
Beery VMI	E > C	>.05	>.05	8.68	7.81
ITPA 4	E > C	>.05	>.02	14.91	12.94
ITPA 5	E > C	>.005	>.01	17.64	14.24
ITPA 7	E > C	>.05	>.02	12.91	11.52
Gross Motor Observations	E > C	>.005	>.01	17.84	14.66
Behavior Rating	E > C	>.05	>.05	17.06	15.84
G I R L S					
ITPA L.Q.	E > C	>.001	>.01	123.39	111.15
PPVT I.Q.	E > C	>.05	>.05	114.30	109.28
Beery	E > C	>.01	>.01	9.17	8.01
ITPA 2	E > C	>.005	>.01	12.34	10.65
ITPA 5	E > C	>.005	>.01	18.43	15.23
Gross Motor Observations	E > C	>.001	>.01	19.93	17.17

Table D-2. Significant Posttest Minus Pretest Differences between the Total Experimental and Total Control Groups by Sex

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
BOYS					
Age	C > E	>.05	>.05	9.28	9.00
ITPA L.Q.	E > C	>.005	>.01	11.91	1.62
ITPA 4	E > C	>.05	>.05	4.22	1.86
ITPA 5	E > C	>.005	>.01	6.97	3.83
ITPA 7	E > C	>.05	>.05	3.62	2.32
Gross Motor Observations	E > C	>.005	>.01	6.75	3.26
GIRLS					
ITPA L.Q.	E > C	>.001	>.01	12.54	-1.25
PPVT I.Q.	E > C	>.005	>.01	8.10	2.14
Beery VMI	E > C	>.01	>.01	3.34	2.36
ITPA 3	E > C	>.001	>.01	4.21	2.31
ITPA 4	E > C	>.05	>.05	4.58	2.55
ITPA 5	E > C	>.05	>.02	6.86	4.12
ITPA 9	E > C	>.05	>.05	4.28	2.53
Gross Motor Observations	E > C	>.005	>.01	6.34	3.07

Table E-1. Chi-Square, Univariate F, and
Univariate F Prime Tests of Pretest Differences
for the Experimental and Control Subgroups by Sex

Variable	BOYS			GIRLS		
	Chi Square	Univariate		Chi Square	Univariate	
		F	F'*		F	F'*
Age	ns	ns		ns	ns	
ITPA L.Q.	>.01		>.005	ns	>.005	
PPVT I.Q.	ns	ns		>.01		>.025
Beery VMI r.s.	ns	>.005		ns	>.005	
ITPA 1 r.s.	>.01		>.005	ns	ns	
ITPA 2 r.s.	ns	>.025		>.05		>.005
ITPA 3 r.s.	ns	>.005		ns	>.005	
ITPA 4 r.s.	ns	ns		ns	>.05	
ITPA 5 r.s.	>.001		>.005	ns	>.005	
ITPA 6 r.s.	ns	>.005		ns	>.005	
ITPA 7 r.s.	ns	ns		>.05		>.005
ITPA 8 r.s.	>.01		ns	ns	>.005	
ITPA 9 r.s.	ns	>.01		ns	>.005	
Gross Motor Observations r.s.	ns	>.005		ns	>.005	
Auditory Discrim. r.s.	>.001		ns	>.001		ns
Behavior Rating r.s.	ns	>.025		ns	ns	
Counting	>.001		ns	>.001		ns

---

*If the Chi Square test is significant, the F Prime Test is used.

Table E-2. Chi-Square, Univariate F, and Univariate F Prime Tests of Posttest Differences for the Experimental and Control Subgroups by Sex

	BOYS			GIRLS		
		Univariate			Univariate	
Variable	Chi Square	F	F'*	Chi Square	F	F'*
Age	ns	ns		ns	ns	
ITPA L.Q.	ns	>.005		ns	>.005	
PPVT I.Q.	ns	>.01		ns	>.005	
Beery VMI r.s.	ns	>.005		ns	>.01	
ITPA 1 r.s.	ns	>.05		ns	>.05	
ITPA 2 r.s.	ns	ns		ns	>.05	
ITPA 3 r.s.	ns	>.01		ns	>.01	
ITPA 4 r.s.	ns	ns		ns	>.005	
ITPA 5 r.s.	ns	>.005		ns	>.005	
ITPA 6 r.s.	ns	>.005		ns	>.005	
ITPA 7 r.s.	ns	>.025		ns	>.05	
ITPA 8 r.s.	ns	ns		>.001		>.005
ITPA 9 r.s.	ns	ns		>.02		>.005
Gross Motor Observations r.s.	ns	>.005		>.01		>.005
Audit. Discrim. r.s.	ns	>.005		>.02		ns
Behavior Rating r.s.	>.01		>.025	>.01		ns
Counting	>.01		>.05	>.001		ns

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*If the Chi Square test is significant, the F Prime Test is used.

Table E-3. Chi Square, Univariate F, and
Univariate F Prime Tests of Posttest Minus Pretest Differences
for the Experimental and Control Subgroups by Sex

Variable	BOYS			GIRLS		
	Chi Square	Univariate		Chi Square	Univariate	
		F	F'*		F	F'*
Age	>.05		ns	ns	ns	
ITPA L.Q.	ns	>.005		ns	>.005	
PPVT I.Q.	ns	ns		ns	ns	
Beery VMI r.s.	ns	>.05		ns	ns	
ITPA 1 r.s.	>.05		ns	ns	ns	
ITPA 2 r.s.	ns	ns		ns	ns	
ITPA 3 r.s.	ns	ns		ns	>.005	
ITPA 4 r.s.	ns	ns		ns	ns	
ITPA 5 r.s.	ns	>.025		ns	>.05	
ITPA 6 r.s.	ns	ns		ns	ns	
ITPA 7 r.s.	ns	ns		ns	ns	
ITPA 8 r.s.	>.01		ns	>.01		ns
ITPA 9 r.s.	ns	ns		ns	>.025	
Gross Motor Observations r.s.	ns	>.05		ns	>.005	
Auditory Discrim. r.s.	>.001		ns	>.001		ns
Behavior Rating r.s.	ns	ns		ns	ns	
Counting	>.001		ns	>.001		ns

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*If the Chi Square test is significant, the F Prime test is used.

Table F-1. Significant Pretest Differences for Boys among Experimental and Control Subgroups

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA L.Q.	b				
	EV > CL	>.05	>.05	112.66	93.38
	EW > CL	>.005	>.01	111.80	93.38
	EI > CM	>.05	>.01	129.88	108.62
	EI > CV	>.05	>.02	129.88	110.16
	EI > CL	>.001	>.01	129.88	93.38
	EI > CW	>.05	>.01	129.88	108.88
	CI > EM	>.05	>.05	128.57	108.60
	CI > EA	>.005	>.01	128.57	89.66
	CI > EV	>.05	>.05	128.57	112.66
	CI > EL	>.001	>.01	128.57	92.14
	CI > EW	>.01	>.01	128.57	111.80
	c				
	EW > EA	>.05	>.01	111.80	89.66
	EW > EL	>.05	>.01	111.80	92.14
	EI > EV	>.05	>.05	129.88	112.66
	EI > EL	>.001	>.01	129.88	92.14
	EI > EW	>.01	>.01	129.88	111.80
Beery VMI r.s.*	b				
	EI > CM	>.05	>.01	7.44	4.87
	EI > CV	>.01	>.01	7.44	3.83
	EI > CW	>.05	>.01	7.44	4.88
	CI > EM	>.01	>.01	7.00	3.80
	CI > EV	>.05	>.01	7.00	4.16
	CI > EW	>.05	>.02	7.00	5.33
	c				
	EI > EV	>.05	>.01	7.44	4.16
	EI > EW	>.05	>.02	7.44	5.33
ITPA 1 r.s.	b				
	EW > CA	>.05	>.02	17.46	6.00
	CI > EA	>.05	>.01	18.57	10.66

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-1. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA 2 r.s.*	b				
	CI > EV	>.01	>.01	12.50	7.00
	CI > EL	>.05	>.01	12.50	8.85
	CI > EW	>.05	>.01	12.50	9.53
ITPA 3 r.s.	a				
	EL > CL	>.05	>.02	12.00	8.15
	b				
	EV > CL	>.01	>.01	13.83	8.15
	EW > CL	>.01	>.01	12.33	8.15
	EI > CL	>.005	>.01	13.77	8.15
	CI > EM	>.01	>.01	16.14	10.40
	CI > EA	>.005	>.01	16.14	7.66
	CI > EL	>.05	>.01	16.14	12.00
	CI > EW	>.01	>.01	16.14	12.33
	c				
	EI > EA	>.05	>.01	13.77	7.66
ITPA 5 r.s.	b				
	EV > CL	>.05	>.05	12.16	7.23
	EI > CM	>.05	>.02	14.22	7.75
	EI > CL	>.005	>.01	14.22	7.23
	EI > CW	>.05	>.05	14.22	9.33
	CI > EA	>.01	>.02	16.00	7.00
	CI > EL	>.001	>.01	16.00	6.28
	CI > EW	>.01	>.01	16.00	10.73
	c				
	EV > EL	>.05	>.02	12.16	6.28
	EW > EL	>.05	>.01	10.73	6.28
	EI > EL	>.005	>.01	14.22	6.28

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-1. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA 6 r.s.*	b				
	EI > CL	>.005	>.01	15.00	9.69
	EI > CW	>.05	>.01	15.00	10.33
	CI > EM	>.01	>.02	14.64	8.80
	CI > EL	>.005	>.01	14.64	8.00
	CI > EW	>.05	>.01	14.64	11.06
	c				
	EI > EM	>.05	>.01	15.00	8.80
	EI > EL	>.005	>.01	15.00	8.00
	EI > EW	>.05	>.01	15.00	11.06
ITPA 9 r.s.	b				
	EI > CV	>.05	>.05	9.88	5.66
	EI > CL	>.005	>.01	9.88	5.00
	EW > CL	>.05	>.01	8.33	5.00
	c				
	EI > EL	>.05	>.01	9.88	6.00
Gross Motor Observations r.s.	b				
	EV > CM	>.05	>.01	12.16	3.75
	EL > CM	>.05	>.01	10.42	3.75
	EW > CM	>.005	>.01	12.26	3.75
	EI > CM	>.01	>.01	13.22	3.75
	CL > EM	>.01	>.01	13.46	3.60
	CW > EM	>.05	>.01	11.11	3.60
	CI > EM	>.005	>.01	13.78	3.60
	c				
	EV > EM	>.05	>.01	12.16	3.60
	EW > EM	>.01	>.01	12.26	3.60
	EI > EM	>.05	>.01	13.22	3.60
Behavior Rating r.s.	b				
	EI > CW	>.005	>.01	17.44	11.55
	CI > EM	>.05	>.02	16.85	12.00
	c				
	EI > EM	>.05	>.02	17.44	12.00

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-2. Significant Pretest Differences for Girls among Experimental and Control Subgroups

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA L.Q.	[b]				
	EW > CL	>.05	>.02	109.88	93.14
	EI > CM	>.001	>.01	127.57	101.37
	EI > CV	>.005	>.01	127.57	103.80
	EI > CL	>.001	>.01	127.57	93.14
	EI > CR	>.005	>.01	127.57	99.66
	EI > CW	>.005	>.01	127.57	110.07
	CW > EL	>.05	>.01	110.07	95.83
	CI > EM	>.001	>.01	126.28	98.25
	CI > EV	>.001	>.01	126.28	101.00
	CI > EL	>.001	>.01	126.28	95.83
	CI > EW	>.005	>.01	126.28	109.88
	[c]				
	EI > EM	>.001	>.01	127.57	98.25
	EI > EV	>.005	>.01	127.57	101.00
	EI > EL	>.001	>.01	127.57	95.83
	EI > EW	>.005	>.01	127.57	109.88
PPVT I.Q.	[b]				
	EW > CL	>.05	>.05	107.22	90.00
	EI > CL	>.005	>.01	113.71	90.00
	CW > EL	>.05	>.01	107.15	92.16
	CI > EM	>.05	>.01	114.68	101.87
	CI > EL	>.005	>.01	114.68	92.16
	[c]				
	EI > EL	>.01	>.01	113.71	92.16
Beery VMI r.s.*	[b]				
	EW > CM	>.05	>.02	6.77	4.37
	EW > CV	>.05	>.01	6.77	3.40
	EI > CM	>.05	>.01	6.92	4.37
	EI > CV	>.01	>.01	6.92	3.40
	EI > CR	>.05	>.05	6.92	3.66

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-2. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
Beery VMI r.s.* (cont'd.)	b(cont'd)				
	EI > CW	>.05	>.05	6.92	5.07
	CI > EM	>.01	>.01	7.24	4.62
	CI > EV	>.005	>.01	7.24	3.80
	CI > EL	>.05	>.02	7.24	5.00
	c				
	EW > EV	>.05	>.05	6.77	3.80
	EI > EM	>.05	>.02	6.92	4.62
	EI > EV	>.05	>.02	6.92	3.80
ITPA 2 r.s.	b				
	EI > CV	>.05	>.01	10.28	5.00
	CI > EL	>.05	>.01	9.76	5.83
	c				
	EI > EL	>.05	>.01	10.28	5.83
ITPA 3 r.s.	b				
	EI > CM	>.05	>.01	16.85	12.50
	EI > CL	>.005	>.01	16.85	10.28
	EI > CW	>.05	>.01	16.85	13.00
	CI > EM	>.005	>.01	15.56	10.00
	CI > EV	>.05	>.01	15.56	10.60
	CI > EL	>.01	>.01	15.56	10.00
	c				
	EI > EM	>.001	>.01	16.85	10.00
	EI > EV	>.01	>.01	16.85	10.60
	EI > EL	>.005	>.01	16.85	10.00
	EI > ER	>.05	>.01	16.85	10.00
ITPA 4 r.s.	b				
	CI > EM	>.01	>.01	13.24	8.50
	CI > EL	>.05	>.01	13.24	8.16

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-2. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA 5 r.s.*	b				
	EI > CM	>.05	>.02	14.42	9.37
	EI > CV	>.05	>.01	14.42	8.80
	EI > CL	>.005	>.01	14.42	7.71
	CI > EM	>.05	>.01	13.20	9.37
	CI > EL	>.05	>.01	13.20	8.16
	c				
	EI > EM	>.05	>.01	14.42	9.37
	EI > EL	>.01	>.01	14.42	8.16
ITPA 6 r.s.	b				
	EI > CM	>.05	>.05	13.35	9.62
	EI > CV	>.01	>.01	13.35	6.80
	CI > EM	>.01	>.01	14.36	9.50
	CI > EV	>.05	>.02	14.36	10.00
	c				
	EI > EM	>.05	>.05	13.35	9.50
ITPA 7 r.s.	b				
	EI > CM	>.005	>.01	12.28	7.12
	EI > CV	>.05	>.01	12.28	7.80
	EI > CL	>.005	>.01	12.28	7.00
	EI > CR	>.05	>.01	12.28	6.66
	EI > CW	>.005	>.01	12.28	8.38
	CW > EL	>.05	>.01	8.38	4.50
	CI > EM	>.05	>.01	11.12	7.62
	CI > EV	>.05	>.05	11.12	7.60
	CI > EL	>.001	>.01	11.12	4.50
	c				
	EW > EL	>.005	>.01	10.55	4.50
	EI > EM	>.005	>.01	12.28	7.62
	EI > EV	>.05	>.02	12.28	7.60
	EI > EL	>.001	>.01	12.28	4.50

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-2. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA 8 r.s.*	b				
	EI > CM	>.05	>.01	22.85	15.62
	EI > CL	>.001	>.01	22.85	10.85
	EI > CR	>.001	>.01	22.85	6.66
	EI > CW	>.005	>.01	22.85	15.53
	CI > EM	>.005	>.01	21.48	12.75
	CI > EV	>.05	>.01	21.48	13.40
	CI > ER	>.05	>.05	21.48	11.50
	c				
	EI > EM	>.005	>.01	22.85	12.75
	EI > EV	>.01	>.01	22.85	13.40
	EI > ER	>.05	>.02	22.85	11.50
	EI > EW	>.05	>.02	22.85	17.22
ITPA 9 r.s.	b				
	EW > CM	>.05	>.01	7.66	3.75
	EI > CM	>.001	>.01	10.85	3.75
	EI > CR	>.05	>.01	10.85	5.00
	CI > EM	>.005	>.01	10.16	5.12
	CI > EV	>.05	>.02	10.16	5.80
	CI > EL	>.05	>.05	10.16	6.16
	c				
	EI > EM	>.005	>.01	10.85	5.12
	EI > EV	>.05	>.01	10.85	5.80
	EI > EL	>.05	>.02	10.85	6.16
	EI > ER	>.05	>.02	10.85	4.50
Gross Motor Observations r.s.	b				
	EV > CM	>.05	>.01	13.40	5.37
	EL > CM	>.05	>.05	11.33	5.37
	ER > CM	>.05	>.01	15.00	5.37
	EW > CM	>.001	>.01	15.55	5.37
	EI > CM	>.001	>.01	17.07	5.37
	CV > EM	>.05	>.01	12.80	4.75
	CL > EM	>.005	>.01	14.85	4.75
	CR > EM	>.05	>.05	12.66	4.75
	CW > EM	>.001	>.01	16.76	4.75
	CI > EM	>.001	>.01	15.96	4.75

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-2. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
Gross Motor Observations r.s.* (continued)	c				
	EV > EM	>.05	>.01	13.40	4.75
	EL > EM	>.05	>.05	11.33	4.75
	EW > EM	>.001	>.01	15.55	4.75
	EI > EM	>.001	>.01	17.07	4.75
	EI > EL	>.05	>.05	17.07	11.33

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-3. Significant Posttest Differences for Boys among Experimental and Control Subgroups

Variable	Groups	Duncan Test	t-Test	Mean Larger	Mean Smaller
ITPA L.Q.	a				
	EL > CL	>.05	>.02	122.85	102.46
	EI > CI	>.05	>.02	133.88	120.14
	b				
	EV > CL	>.05	>.05	123.00	102.46
	EW > CL	>.01	>.01	118.20	102.46
	EI > CM	>.005	>.01	133.88	108.25
	EI > CV	>.05	>.01	133.88	110.16
	EI > CL	>.001	>.01	133.88	102.46
	EI > CW	>.01	>.01	133.88	112.11
	c				
	EI > EW	>.05	>.01	133.88	118.20
PPVT I.Q.	b				
	EI > CM	>.01	>.05	121.88	105.37
	EI > CL	>.005	>.01	121.88	105.07
Beery VMI r.s.*	a				
	EM > CM	>.05	>.02	8.40	5.00
	b				
	EV > CM	>.05	>.05	7.83	5.00
	EL > CM	>.05	>.01	8.00	5.00
	EW > CM	>.001	>.01	8.80	5.00
	EI > CM	>.001	>.01	9.66	5.00
	EI > CV	>.05	>.02	9.66	7.16
	EI > CW	>.05	>.01	9.66	7.33
ITPA 1 r.s.	b				
	CI > EM	>.05	>.02	25.35	18.60
ITPA 3 r.s.	b				
	EW > CL	>.05	>.02	17.13	14.23
	EI > CM	>.05	>.01	18.55	14.25
	EI > CL	>.01	>.01	18.55	14.23

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-3. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA 5 r.s.*	a				
	EL > CL	>.05	>.05	16.42	11.69
	b				
	EA > CL	>.05	>.02	20.00	11.69
	EV > CL	>.05	>.01	18.33	11.69
	EW > CL	>.05	>.01	17.26	11.69
	EI > CM	>.05	>.01	20.00	12.75
	EI > CV	>.05	>.05	20.00	12.50
	EI > CL	>.005	>.01	20.00	11.69
	EI > CW	>.05	>.05	20.00	14.66
ITPA 6 r.s.	a				
	EI > CI	>.05	>.05	18.88	15.28
	b				
	EI > CM	>.05	>.01	18.88	13.50
	EI > CV	>.05	>.01	18.88	13.16
	EI > CL	>.001	>.01	18.88	11.07
	c				
	EI > EM	>.05	>.05	18.88	13.60
	EI > EV	>.05	>.01	18.88	14.50
	EI > EL	>.05	>.01	18.88	13.14
	EI > EW	>.005	>.01	18.88	13.00
ITPA 7 r.s.	b				
	EV > CM	>.05	>.01	13.16	9.12
	EL > CM	>.05	>.01	12.57	9.12
	EW > CM	>.005	>.01	13.40	9.12
	EW > CL	>.01	>.02	13.40	10.15
	EI > CM	>.05	>.01	13.00	9.12
Gross Motor Observations r.s.	a				
	EW > CW	>.05	>.01	18.33	12.11

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-3. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
Gross Motor Observations r.s.[*] (continued)	b				
	EV > CM	>.01	>.02	18.50	8.62
	EL > CM	>.005	>.01	19.42	8.62
	EL > CW	>.05	>.02	19.42	12.11
	EW > CM	>.001	>.01	18.33	8.62
	EI > CM	>.005	>.01	17.77	8.62
	EI > CW	>.05	>.02	17.77	12.11
Auditory Discrim. r.s.	b				
	CL > EA	>.01	>.02	11.53	10.00
	CW > EM	>.05	>.02	11.77	10.60
	CW > EA	>.01	>.01	11.77	10.00
	CI > EM	>.05	>.05	11.57	10.60
	CI > EA	>.01	>.01	11.57	10.00
	c				
	EL > EM	>.05	>.05	11.71	10.60
	EL > EA	>.05	>.01	11.71	10.00
	EW > EM	>.05	>.01	11.73	10.60
	EW > EA	>.005	>.01	11.73	10.00
	EI > EM	>.05	>.02	11.77	10.60
	EI > EA	>.01	>.01	11.77	10.00
Behavior Rating r.s.	No group examined showed significant differences				
Counting	No group examined showed significant differences				

---

[*] r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-4. Significant Posttest Differences for Girls among Experimental and Control Subgroups

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA L.Q.	[a]				
	EI > CI	>.05	>.05	134.92	124.32
	[b]				
	EM > CV	>.05	>.01	118.00	95.40
	EL > CV	>.05	>.01	120.00	95.40
	EW > CM	>.05	>.05	122.11	100.75
	EW > CV	>.05	>.01	122.11	95.40
	EW > CL	>.05	>.05	122.11	103.14
	EI > CM	>.001	>.01	134.92	100.75
	EI > CA	>.005	>.01	134.92	84.00
	EI > CV	>.001	>.01	134.92	95.40
	EI > CL	>.001	>.01	134.92	103.14
	EI > CR	>.05	>.01	134.92	111.33
	EI > CW	>.001	>.01	134.92	106.76
	[c]				
	EI > EM	>.05	>.01	134.92	118.00
	EI > EV	>.01	>.01	134.92	107.60
Peabody I.Q.	[b]				
	EM > CL	>.05	>.05	113.50	93.71
	EW > CL	>.05	>.02	113.66	93.71
	EI > CM	>.05	>.01	119.71	106.25
	EI > CV	>.05	>.01	119.71	103.00
	EI > CL	>.001	>.01	119.71	93.71
	EI > CW	>.05	>.02	119.71	107.53
Beery VMI r.s.*	[a]				
	EW > CW	>.05	>.01	10.11	7.61
	[b]				
	EW > CM	>.005	>.01	10.11	6.25
	EW > CV	>.05	>.01	10.11	6.80
	EW > CL	>.05	>.05	10.11	7.42
	EI > CM	>.001	>.01	10.28	6.25
	EI > CV	>.01	>.01	10.28	6.80

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-4. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
Beery VMI r.s.[*] (continued)	b(cont'd.)				
	EI > CL	>.01	>.01	10.28	7.42
	EI > CR	>.05	>.02	10.28	7.33
	EI > CW	>.005	>.01	10.28	7.61
	CI > ER	>.05	>.02	9.36	6.00
	c				
	EI > EM	>.05	>.01	10.28	8.25
	EI > EV	>.05	>.01	10.28	7.60
	EI > ER	>.05	>.01	10.28	6.00
ITPA 1 r.s.	b				
	EI > CM	>.05	>.01	25.28	18.12
	EI > CA	>.05	>.01	25.28	13.50
	EI > CV	>.05	>.01	25.28	18.60
	EI > CW	>.05	>.01	25.28	19.15
	c				
	EI > EW	>.05	>.01	25.28	19.77
ITPA 2 r.s.	b				
	EI > CA	>.01	>.01	12.85	5.00
	EI > CV	>.05	>.02	12.85	8.40
	EI > CL	>.05	>.05	12.85	9.42
ITPA 3 r.s.	b				
	EI > CM	>.01	>.01	19.35	14.62
	EI > CA	>.05	>.01	19.35	13.50
	EI > CV	>.05	>.01	19.35	14.60
	EI > CL	>.005	>.01	19.35	13.57
	EI > CW	>.05	>.01	19.35	16.23
	c				
	EI > EM	>.05	>.02	19.35	15.75
	EI > EV	>.05	>.01	19.35	14.80

---

[*] r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-4. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA 4 r.s.*	[b]				
	EA > CW	>.05	>.02	21.00	13.92
	EA > CI	>.05	>.05	21.00	15.52
	EW > CV	>.05	>.02	14.88	9.80
	EI > CA	>.05	>.05	15.35	8.00
	EI > CV	>.05	>.02	15.35	9.80
	CI > EV	>.05	>.02	15.52	11.00
ITPA 5 r.s.	[a]				
	EW > CW	>.01	>.01	21.44	13.92
	[b]				
	EL > CM	>.05	>.05	19.00	12.00
	EW > CM	>.005	>.01	21.44	12.00
	EW > CL	>.01	>.01	21.44	12.14
	EI > CM	>.05	>.01	18.71	12.00
	EI > CV	>.05	>.01	18.71	11.40
	EI > CL	>.05	>.01	18.71	12.14
	EI > CW	>.05	>.01	18.71	13.92
ITPA 6 r.s.	[b]				
	EW > CM	>.05	>.01	14.88	9.37
	EI > CM	>.005	>.01	15.78	9.37
	EI > CR	>.05	>.01	15.78	9.33
	EI > CW	>.05	>.05	15.78	12.53
ITPA 7 r.s.	[b]				
	EI > CM	>.05	>.01	15.07	10.50
	EI > CV	>.05	>.05	15.07	10.40
	EI > CL	>.05	>.01	15.07	9.71
	EI > CW	>.005	>.01	15.07	10.15
	[c]				
	EI > EM	>.05	>.01	15.07	10.37
	EI > EL	>.01	>.01	15.07	9.16

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-4. (continued)

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA 8 r.s.*	b				
	EI > CM	>.005	>.01	26.78	19.25
	EI > CV	>.01	>.02	26.78	18.20
	EI > CL	>.005	>.01	26.78	17.57
	EI > CR	>.05	>.02	26.78	17.00
	EI > CW	>.001	>.01	26.78	19.30
	CI > EM	>.05	>.01	24.68	19.75
	CI > EV	>.01	>.01	24.68	16.80
	CI > EL	>.05	>.05	24.68	20.00
	c				
	EI > EM	>.005	>.01	26.78	19.75
	EI > EV	>.005	>.01	26.78	16.80
	EI > EL	>.05	>.05	26.78	20.00
ITPA 9 r.s.	b				
	EI > CM	>.05	>.01	13.35	9.12
	EI > CA	>.005	>.01	13.35	4.00
	EI > CV	>.05	>.01	13.35	8.60
	c				
	EI > EM	>.05	>.01	13.35	9.87
Gross Motor Observations r.s.	a				
	EM > CM	>.05	>.01	17.75	11.87
	b				
	EV > CM	>.01	>.01	19.40	11.87
	EL > CM	>.01	>.01	19.16	11.87
	EW > CM	>.005	>.01	19.33	11.87
	EI > CM	>.001	>.01	21.92	11.87
	EI > CA	>.05	>.01	21.92	15.00
	EI > CV	>.01	>.01	21.92	15.60
	EI > CL	>.005	>.01	21.92	15.28
	EI > CW	>.05	>.02	21.92	17.92
	c				
	EI > EM	>.05	>.01	21.92	17.75

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-5. Significant Posttest Minus Pretest Differences for Boys among Experimental and Control Subgroups

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA L.Q.	a				
	EL > CL	>.05	>.02	30.71	9.07
	b				
	EA > CI	>.005	>.01	29.33	-8.42
	EV > CI	>.05	>.05	10.33	-8.42
	EL > CM	>.005	>.01	30.71	-0.37
	EL > CV	>.01	>.01	30.71	0.00
	EL > CW	>.01	>.01	30.71	3.22
	EL > CI	>.001	>.01	30.71	-8.42
	EW > CI	>.05	>.01	6.40	-8.42
	c				
	EA > EW	>.05	>.01	29.33	6.40
	EA > EI	>.05	>.01	29.33	4.00
	EL > EM	>.05	>.05	30.71	7.80
	EL > EW	>.005	>.01	30.71	6.40
	EL > EI	>.01	>.01	30.71	4.00
Beery VMI r.s.*	b				
	EV > CM	>.05	>.01	3.66	0.12
	EW > CM	>.005	>.01	3.46	0.12
ITPA 5 r.s.	a				
	EL > CL	>.05	>.01	10.14	4.46
	b				
	EA > CL	>.05	>.01	13.00	4.46
	EA > CI	>.01	>.01	13.00	1.71
	EL > CV	>.05	>.01	10.14	2.83
	EL > CI	>.005	>.01	10.14	1.71
	EW > CI	>.05	>.02	6.53	1.71

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-5 continued.

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
Gross Motor Observations r.s.*	[a]				
	EL > CL	>.05	>.05	9.00	2.69
	EW > CW	>.05	>.05	6.06	1.00
	[b]				
	EM > CL	>.05	>.05	10.40	2.69
	EM > CW	>.05	>.02	10.40	1.00
	EM > CI	>.05	>.02	10.40	3.14
	EL > CW	>.05	>.01	9.00	1.00
	EL > CI	>.05	>.01	9.00	3.14

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-6. Significant Posttest Minus Pretest Differences for Girls among Experimental and Control Subgroups

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA L.Q.	a				
	EM > CM	>.05	>.01	19.75	-0.62
	EW > CW	>.05	>.05	12.22	-3.30
	b				
	EM > CW	>.01	>.01	19.75	-3.30
	EM > CI	>.005	>.01	19.75	-1.96
	EL > CM	>.05	>.01	24.16	-0.62
	EL > CW	>.005	>.01	24.16	-3.30
	EL > CI	>.005	>.01	24.16	-1.96
	EW > CV	>.05	>.05	12.22	-8.40
	EW > CI	>.05	>.02	12.22	-1.96
	EI > CA	>.05	>.01	7.35	-2.25
	c				
	EL > EI	>.05	>.05	24.16	7.35
ITPA 3 r.s.*	a				
	EM > CM	>.05	>.01	5.75	2.12
	EL > CL	>.05	>.02	7.50	3.28
	b				
	EM > CI	>.01	>.01	5.75	2.12
	EL > CM	>.01	>.01	7.50	2.12
	EL > CW	>.05	>.01	7.50	3.23
	EL > CI	>.001	>.01	7.50	2.12
	c				
	EM > EI	>.05	>.01	5.75	2.50
	EL > EW	>.05	>.05	7.50	3.55
	EL > EI	>.005	>.01	7.50	2.50
ITPA 5 r.s.	a				
	EW > CW	>.01	>.01	10.66	2.46

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table F-6 continued.

Variable	Groups	Duncan Test	t-Test	Mean	
				Larger	Smaller
ITPA 5 r.s.*(cont'd.)	b				
	EL > CM	>.05	>.05	10.83	2.62
	EL > CW	>.05	>.01	10.83	2.46
	EW > CM	>.05	>.05	10.66	2.62
	EW > CV	>.05	>.05	10.66	2.60
	EW > CI	>.05	>.05	10.66	5.88
	c				
	EW > EI	>.05	>.01	10.66	4.28
ITPA 9 r.s.	b				
	EL > CW	>.05	>.02	7.00	2.07
	EW > CA	>.05	>.01	3.77	-5.50
	EI > CA	>.05	>.01	2.50	-5.50
Gross Motor Observations r.s.	a				
	EM > CM	>.05	>.02	13.00	6.50
	b				
	EM > CV	>.01	>.01	13.00	2.80
	EM > CR	>.05	>.02	13.00	4.33
	EM > CW	>.001	>.01	13.00	1.15
	EM > CI	>.001	>.01	13.00	3.56
	EL > CW	>.05	>.02	7.83	1.15
	c				
	EM > EW	>.005	>.01	13.00	3.77
	EM > EI	>.005	>.01	13.00	4.85

---

*r.s. indicates raw score.

[a] Matched experimental and control groups with similar program need.

[b] Unmatched experimental and control groups.

[c] Unmatched experimental groups.

Table G-1. Pretest mean Scores for Experimental and Control Groups, Prekindergarten Experiment, Second Year

Variable	BOYS			GIRLS		
	E	Cn	Co	E	Cn	Co
Age	52.9	53.8	53.2	53.7	53.8	53.6
ITPA L.Q.	109.1	106.2	102.4	107.8	106.7	108.5
PPVT I.Q.	108.8	106.9	107.7	104.4	104.2	103.4
Beery VMI	5.3	5.8	5.0	5.8	8.0	6.0
ITPA 1	18.3	17.4	15.0	17.9	17.8	17.9
ITPA 2	9.1	9.6	8.3	10.0	8.6	9.6
ITPA 3	12.1	12.9	11.7	12.4	12.7	13.0
ITPA 4	10.7	9.4	9.5	11.1	11.2	10.7
ITPA 5	11.8	9.6	10.3	10.6	12.1	11.2
ITPA 6	11.0	10.9	10.4	11.0	10.5	11.1
ITPA 7	8.8	8.8	9.1	8.7	8.5	8.5
ITPA 8	17.0	17.1	15.2	17.5	17.2	16.9
ITPA 9	7.8	8.0	7.3	8.4	8.1	8.5
Gross Motor Observations	11.7	11.3	10.5	13.7	13.9	14.5
Auditory Discrimination	10.7	11.1	10.7	11.0	11.0	11.1

Table G-2. Posttest Mean Scores for Experimental and Control Groups, Prekindergarten Experiment, Second Year

Variable	BOYS			GIRLS		
	E	Cn	Co	E	Cn	Co
Age	71.6	72.5	72.1	72.6	71.9	72.2
ITPA L.Q.	117.6	114.9	112.0	117.3	112.5	113.1
PPVT I.Q.	118.2	115.6	115.1	112.1	110.4	109.4
Beery VMI	10.8	11.1	10.8	11.3	11.0	10.9
ITPA 1	25.1	26.8	23.6	26.2	25.4	23.9
ITPA 2	14.3	13.8	14.0	13.2	12.8	13.9
ITPA 3	20.0	19.7	19.6	20.3	19.9	20.0
ITPA 4	16.0	15.7	16.1	17.1	17.2	16.6
ITPA 5	19.6	19.5	18.3	20.3	18.4	18.8
ITPA 6	16.5	15.3	15.8	14.8	14.8	15.7
ITPA 7	14.2	13.7	13.1	14.7	14.4	13.3
ITPA 8	22.6	23.3	21.2	23.1	22.6	22.7
ITPA 9	13.1	13.2	13.1	13.5	12.7	13.7
Gross Motor Observations	20.3	18.8	18.3	21.3	21.0	21.0
Auditory Discrimination	11.7	11.7	11.7	11.6	11.7	11.7

Table G-3. Posttest Minus Pretest Mean Growth for Experimental and Control Groups Prekindergarten Experiment, Second Year

Variable	BOYS			GIRLS		
	E	Cn	Co	E	Cn	Co
Age	18.7	18.7	18.8	18.9	18.0	18.5
ITPA L.Q.	9.1	8.6	9.6	9.3	6.0	5.0
PPVT I.Q.	10.1	8.7	7.3	7.3	6.2	5.9
Beery VMI	5.4	5.2	5.7	5.5	4.8	4.8
ITPA 1	7.1	9.4	8.5	7.9	7.7	6.6
ITPA 2	5.3	4.2	5.7	3.0	4.0	4.2
ITPA 3	8.0	6.8	7.8	7.9	7.1	6.8
ITPA 4	5.8	6.2	6.6	6.0	6.0	6.0
ITPA 5	7.6	9.8	7.9	9.8	6.2	7.2
ITPA 6	5.4	4.4	5.3	3.9	4.1	4.6
ITPA 7	5.4	4.8	4.0	5.8	5.9	4.6
ITPA 8	5.6	6.1	6.0	5.6	5.4	6.0
ITPA 9	5.2	5.2	5.7	5.0	4.6	5.3
Gross Motor Observations	8.5	7.4	7.8	7.8	6.9	6.1
Auditory Discrimination	1.0	0.6	1.0	0.7	0.6	0.6

Table G-4. Mean Scores for Experimental and Control Groups on the Metropolitan Readiness Tests, Prekindergarten Experiment, Second Year

Variable	BOYS			GIRLS		
	E	Cn	Co	E	Cn	Co
Word Meaning	11.0	11.1	10.6	10.9	11.1	11.0
Listening	12.6	12.0	12.1	12.2	11.7	12.3
Matching	10.1	10.4	9.7	11.2	10.9	10.4
Alphabetation	12.1	12.6	10.9	13.0	12.8	12.2
Numbers	15.0	15.4	14.4	15.9	14.9	14.8
Copying	8.7	8.0	8.4	10.6	9.0	9.0
Total	70.5	70.0	66.4	74.6	71.0	70.3

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This report concerns the second year of a three and one-half year project. The prekindergarten research involved matched groups of children (91 experimental, 115 control), representative of the local population, whose developmental needs (motor, auditory, visual, language, retention) were identified by a test battery. Half-day classes focused on specific need, for twenty minutes daily. Children with no major weakness had a program to develop cognitive skills. Activities were conducted within the framework of a well balanced prekindergarten program. Results indicated that the experimental group excelled the control group not participating in the program at a statistically significant level of confidence.

The kindergarten experiment was a follow-up study of the prekindergarten children of the previous year (80 experimental, 124 control). These children attended many public, private, and parochial kindergartens offering a wide variety of programs. The results indicated that the experimental group did not maintain the superiority at a statistically significant level found at the end of the prekindergarten year.

During the third year of the study, the effect of the prekindergarten experience on success in school will be measured as the children undertake the more formal demands of reading and mathematics.

16. RETRIEVAL TERMS *(Continue on reverse)*

Assessment of Basic Skills
Auditory Skills Development
Basic Skills Development
Child Development
Cognitive Skills Development
Development Skills
Diagnostic Preschool Training
Early Childhood Education
Individualized Programming
Individual Testing
Intelligence
Intervention
Language Skills Development
Motor Skills Development

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Metropolitan Readiness Tests
Peabody Picture Vocabulary Test

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	Personalized Programming Prekindergarten Education Preschool Education Visual Skills Development		

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